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RECENT FRENCH EXPEDITIONS IN WEST AFRICA, 1894–1899.

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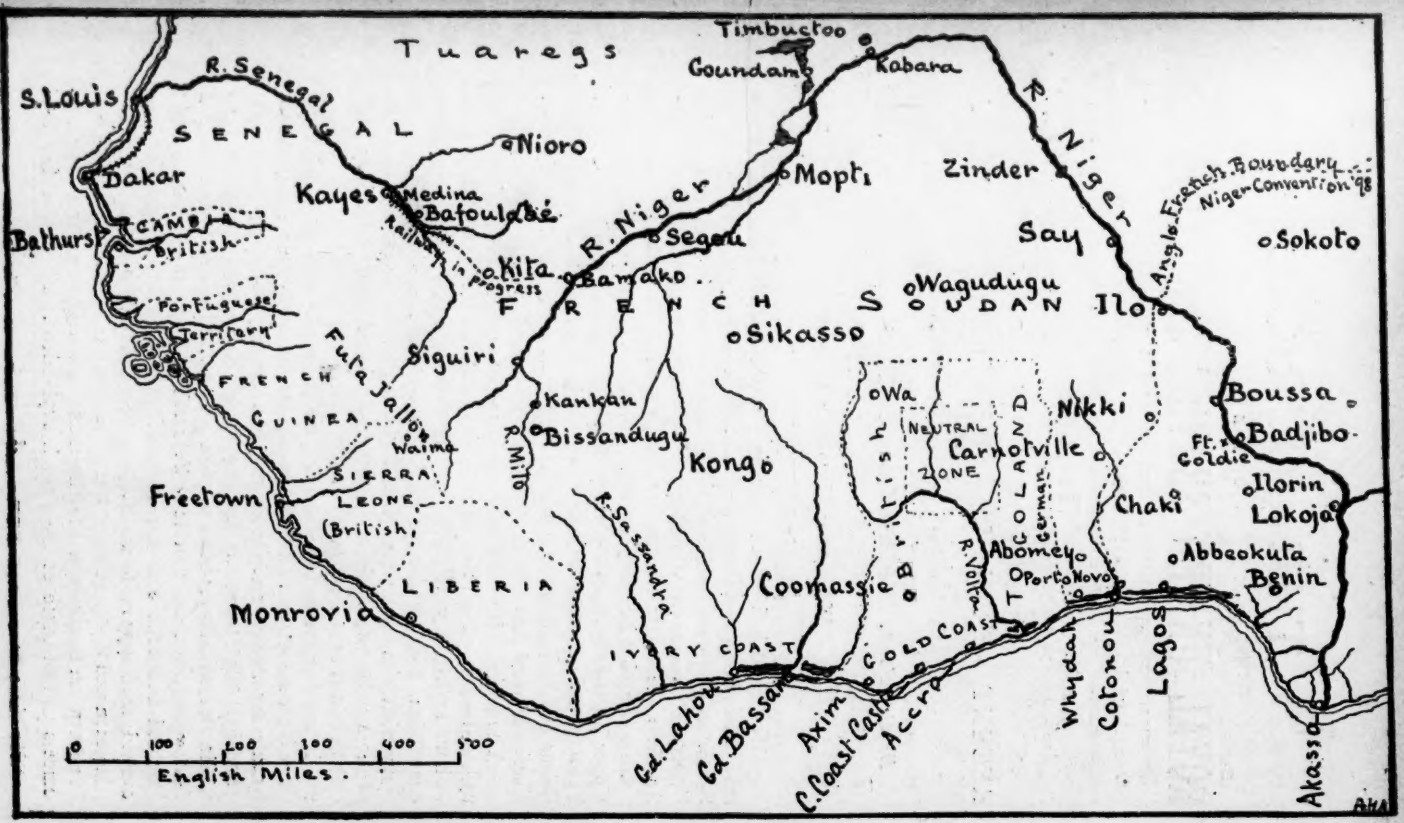
Wednesday, November 29th, 1899.

ON May 11th, 1894, a lecture by Captain Pasfield Oliver, R.A., was read in this theatre on the subject of French operations in the Western Soudan, with special reference to the advance from the Senegal to the Upper Niger. In that very able paper the course of the French penetration into the Niger country was followed in detail from the operations against Ahmadou and Samory in the region between the Senegal and the Upper Niger in 1879, to the occupation of Timbuctoo, in January, 1894. I propose this afternoon to take up the subject at the point where Captain Oliver left it, and to trace the development of the French Colonial Empire in West Africa from 1894 to the present year.

The period has witnessed a number of campaigns, of which most of us have read only from time to time some brief notice in the daily papers, without having any very clear idea of their plan, results, or general connection. I do not claim to speak at first-hand of these matters; but in connection with other work I have had to follow rather closely the story of these "little wars" in the interior of West Africa, and to-day all I claim to do is to share with my fellow members of the Institution some of the interesting information that I have collected from various French sources on the subject. I shall try to make the narrative easier to follow by showing a number of sketch maps and plans illustrating the various campaigns, and using the lantern for this purpose. But before I go further, let me add one more word of preface. The period with which I deal witnessed a crisis in the affairs of the Niger region that brought England and France to the verge of war. If a terrible conflict was averted, the happy result was due, in the first place, to the action of the statesmen and diplomatists of the two countries; but, in the second, and in perhaps an equal degree, to the tactful soldierly courtesy of our own officers and of those of the French expeditions. For weeks they held



SKETCH MAP OF THE WEST COAST TERRITORY AND NIGER BASIN.

posts in the Lagos hinterland where the rival flags flew near each other, often almost side by side. There were a score of occasions when a display of temper or a want of tact on either side might have produced a skirmish in the African forest that would have found a terrible echo in the British Channel and the Mediterranean. But these brave men found the means to avoid armed conflict, whilst preserving the honour of their flags, and reserving all rights on either side. Leaving it to the diplomatists in London and Paris to settle the dispute, they met on terms of mutual courtesy, respect, and goodwill. Let us not forget the services they thus rendered to the best interests of both nations. We do not introduce politics here, and I shall not touch upon the aspects of this dispute that have been the subject of controversy. I am content to say that I am one of the many who hold that in the wilds of Africa there is ample room for Britain and France to work out, each in its own sphere, the task that both have taken up so zealously—the task of not merely acquiring spheres of influence and openings for commerce, not merely painting the map red or blue as the case may be, but the great work of grappling with armed Moslem fanaticism, breaking the power of slave-hunting emirs, and sanguinary fetish-worshipping negro kinglets, and bringing to the peoples of the Dark Continent peace built upon order and law such as we know it here in Europe.

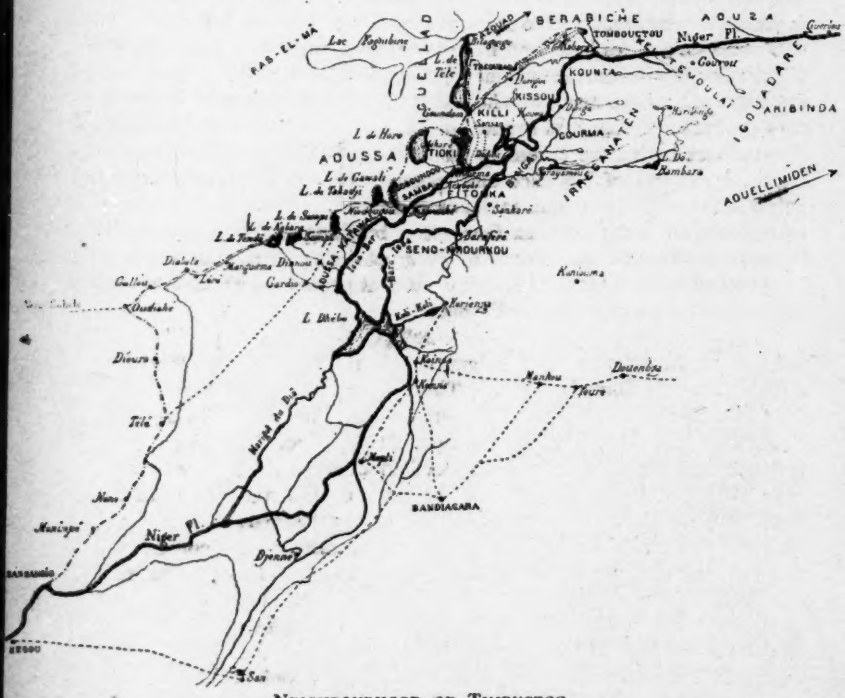
In order to make what follows intelligible, I must very briefly note some points in the earlier campaigns which you will find dealt with in detail in Captain Oliver's paper. The French reached the Niger Valley from the Senegal. General Faidherbe, when he was Governor of Senegambia under the Empire, had formed the project of opening a route for trade and conquest across the watershed between the Upper Senegal and the Upper Niger. Kayes, at the head of the navigation on the Senegal, was made the starting-point for reconnaissances to the Niger; surveys were made for a light railway, afterwards partly constructed, and forts were built in the hilly country it traversed. These preliminary operations brought the French into conflict with El Hadj Omar, a kind of West African Mahdi, who had built up a Mohammedan kingdom on the Upper Senegal, and in the country between it and the Niger. The war of 1870 put an end for a while to schemes of colonial conquest. But the advance began again on the lines traced out by Faidherbe in 1879, just twenty years ago.

In the ten years between 1879 and 1889, the French, under soldiers like Gallieni, Achinard, Forey, Desbordes, Monteil, Binger, and Combes, made themselves masters of the hill country round the head of the Senegal, and, between it and the Niger, secured the highlands of the Futa Djallon, and gained a firm footing on the Upper Niger. This was done partly by hard fighting, partly by skilfully winning the support of the minor chiefs. The railway from Kayes was laid, and a gun-boat was conveyed in sections to the Niger. The power of Ahmadou, the ruler of Segu, and the son of Hadj Omar, was broken; and then the French came in contact with one of the most remarkable native soldiers and rulers of West Africa—Samadhu or Samory, whose territory lay to the

SKETCH MAP OF THE WEST COAST TERRITORY AND NIGER BASIN.

south and west of Ahmadou's possessions, partly on the north bank of the Niger, but chiefly between its upper waters and the hinterland of Liberia and Sierra Leone.

Samory, like the Mahdi of the Eastern Soudan, was a man of low birth, who had risen to power by posing in the first instance as something of a prophet and a religious reformer. Born about 1846, he had begun in early manhood to preach a holy war, and at the head of the adventurers who gathered to his standard, he added tribe after tribe and



NEIGHBOURHOOD OF TIMBUCTOO.

village after village to his possessions. His camp was his capital, and he was always on the move. In 1880 he crossed the Niger, and in 1882 he came into conflict with the French advance from the Senegal.

I must refer you to Captain Pasfield Oliver's paper for the account of the campaigns that followed. With intervals of peace, the fighting went on till 1889, when Samory acknowledged as French all the country north of the Niger.

But war broke out again in 1890. The French in that year completed the conquest of Segu north of the Niger, and south of the river they fought their way up the Milo River, an affluent of the Niger, and began the process of cutting Samory off from his recruiting ground in the Liberian hinterland and forcing him eastwards. In 1892-94 this process

continued. The chain of posts pushed southwards from the Niger gained touch with the French settlements of the Ivory Coast. At the same time the advance down the Niger from Bammako continued, enveloping Samory on the northward. In this direction lay Timbuctoo, the starting-point of numerous trade routes across the Sahara to the northward, and eastward towards Sokoto and the region of Lake Chad. It would have been sound policy to complete the destruction of Samory's power before venturing to occupy Timbuctoo, and push further to the eastward, but the attraction of the great centre proved too much for such prudent considerations to operate, and Timbuctoo was "rushed" by the French river column. Captain Pasfield Oliver, in the last part of his lecture, told how Colonel Bonnier's column occupied Timbuctoo on January 10th, 1894; how five days later he lost his life in a disastrous expedition against the Tuaregs of the district, and how Colonel Joffre's column relieved the small detachment left by Bonnier at Timbuctoo, and by a series of well-combined operations reduced the Tuaregs to submission. By the end of March, 1894, the French were in secure possession of Timbuctoo, and trade began to develop in the district, caravans coming in by the desert routes from the northward, and lighters and native craft bringing corn, rice, and other produce down the Niger to Kabara, the port of Timbuctoo on the great river.

At this point I take up the story of the French occupation. The city was held by a small Senegalese garrison, with a handful of French officers and non-commissioned officers. Its communications with the distant base of operations on the Senegal depended on, first, the flotilla of gun-boats, or, rather, armed steam launches running on the Niger, which linked Kabara with the posts of Mopti, Diafarabe, Segu, and Bammako. Thence, the caravan road over the watershed linked Bammako with the railhead of the Kayes railway, and from Kayes there was steam navigation down the Senegal. The chief object of the French colonial administration was to maintain peace and develop trade on the Middle Niger. Bonnier had occupied Timbuctoo without orders, and the step was premature. Until the long line of communications was considerably improved and strengthened, serious military operations in the difficult country round Timbuctoo would be costly and perilous. Accordingly, in June, 1894, when Major Ebener, of the Marine Infantry, was sent to Timbuctoo to take over the command from Colonel Joffre, his instructions were to maintain a pacific attitude, avoid giving any provocation to the Tuareg chiefs of the neighbourhood, complete the surveys of the country along the river, and encourage local trade. The garrison of Timbuctoo was to maintain a post at Kabara to protect the port, and another at Goundam to secure the land route up the river valley, which here passes between the lakes of Faj and Faguibine, but it was ordered that the troops were not to venture further than ten kilometres, or between six and seven miles, from their camps. The route between Timbuctoo and Goudam was to be kept open by occasional movements backwards and forwards of a small column.

The Tuareg chiefs took this prudent policy for a confession of weakness. Before the end of the year one of the most enterprising and warlike among them, N'Gouna, the chief of the Iguellad Tuaregs, began to preach a Jehad against the infidels. With the help of other tribes he formed a camp in the Ras-el-Ma ("head of the waters") district, at the western end of the swampy lake of Faguibine. In the winter of 1894-95 N'Gouna's men repeatedly slipped past the post of Goundam, and raided the country between the lakes and the Niger, carrying off slaves and plunder. They even began at last to attack the convoys between Kabara and Timbuctoo, and in a skirmish near Kabara Lieutenant Patin, of the Soudanese Spahis, was severely wounded in defending a convoy. When M. Grodet, the Governor of the Soudan, visited Timbuctoo in May, 1895, Major Ebener told him that nothing short of an expedition against Ras-el-Ma could make the country secure, but he was told that any serious operations were out of the question; and after a somewhat stormy discussion, Ebener was replaced in command at Timbuctoo by Major Bouvier, of the Foreign Legion. In two months Bouvier was stricken down with malarial fever, and Captain Rouget, of the Marine Infantry, took his place as temporary Governor. Notwithstanding the orders to avoid any conflict with the Tuaregs, it was impossible for French officers to quietly see the villagers, who were supposed to be protected by their flag, raided by the plunderers from Ras-el-Ma. In July, Lieutenant Jacobi, who commanded at Goundam, planned an expedition on his own account. The Tuaregs were returning from a raid into Killi, driving off a large quantity of cattle. Jacobi, with a handful of Senegalese, surprised them by a well-planned forced march, made a sudden attack, recaptured the booty and restored it to the villagers. After this there was for awhile peace along the river.

At the end of July, Major Réjou, a veteran of the French Soudan, arrived at Timbuctoo and took command. He decided that the so-called policy of prudence was really full of danger, and he resolved to meet the Tuareg raids with small flying columns. On August 4th, within a week of his arrival, a detachment from Kabara under Lieutenant Gouraud routed a party of the Kel Antassar Tuaregs near the river. On the 5th a column of 50 Senegalese tirailleurs under Captain Florentin, starting from Goundam surprised and broke up a camp of the same tribe on the shores of Lake Faguibine. At dawn on the following day he was attacked by a large force of Tuaregs; but he had entrenched his bivouac, his sentries were vigilant, and after a hard fight, in which he lost a third of his little party, he beat off the enemy, inflicting severe loss upon them. Happily a distinguished soldier, Colonel De Trentinian, had just been appointed Governor of the Soudan. He heartily approved of Réjou's policy, and sent him reinforcements to enable him to give more vigorous effect to it. In August and September the Tuareg camps on the lake were broken up by flying columns of Senegalese tirailleurs and Soudanese Spahis. In the autumn Réjou left Timbuctoo with a force made up of some hundred Senegalese, a squadron of Spahis and a field-piece, and marching through Goundam, passed to the south of Ras-el-Ma, and

established a new advanced post at Sompi on the land route to the westward. The Tuaregs did not venture to attack him. Returning to Goundam he made a complete circuit of Lake Faguibine driving several bodies of the Tuaregs before him. Tired of this harassing warfare, the Kel Antassar, the most powerful of the tribes, abandoned N'Gouna's confederacy and sued for peace, and Réjou returned to Timbuctoo after having ensured for some time to come the security of the district.

And now Timbuctoo was made the starting-point for the further exploration and occupation of the Niger Valley. Two years before this date, Lieutenant Hourst, of the French Navy, had been directed to organise a boat expedition to follow the downward course of the great river. But on account of the troubles in the neighbourhood of Timbuctoo it was not till the autumn of 1895 that it was considered safe to proceed with the enterprise. The route ran for hundreds of miles through countries where the Tuareg tribes were the dominant race, and during the conflict with the followers of N'Gouna it was thought that a further French advance to the eastward might result in a rally of the river tribes against the expedition. But in October, Lieutenant Hourst at last started from Kayes, conveying the *personnel* and material of his expedition by rail and road across the watershed to Kulikoro, forty miles to the east of Bammako, on the Niger. Here he put together and launched the three large aluminium boats that formed his flotilla. They were manned by some forty "laptots," the boatmen of the Senegal, and for his white colleagues he had Lieutenant Bluzet, Enseigne de vaisseau Baudry, and Dr. Taburet. In January, 1896, the expedition reached Kabara, the port of Timbuctoo, where the final preparations were completed, and Hourst gained a valuable recruit. There had been for some time a mission station of Cardinal Lavigerie's Pères Blancs established in the city. Its superior was a certain Père Hacquart, an experienced African traveller and an excellent linguist. He spoke fluently Arabic and some Tuareg and Fulah dialects. He joined Hourst's expedition, and proved himself a tactful negotiator in his dealings with the Tuareg chiefs along the central bend of the Niger. The three boats, which had already covered more than 600 miles from Kulikoro to Kabara, started eastward on January 22nd, 1896, on their voyage of exploration. They followed the great bend of the river to the south-eastward, and found that for more than 400 miles, till Ansongo was reached, the navigation was perfectly open. Thanks largely to Père Hacquart's diplomacy, Hourst won the friendship and concluded a treaty of protection with Madidu, the chief of the Awulimmiden Tuaregs, the most powerful tribal confederacy on the bend of the river. Between Ansongo and Boussa he found that the navigation was made difficult, and often dangerous, by numerous rapids, the falls of Boussa, where Park met his death, being an effectual barrier between the middle and lower course of the river. After numerous narrow escapes, Boussa was reached and left behind, and there was open water to the sea, the last part of the journey being through British territory. Hourst's exploration of the Niger is one of the most brilliant exploits, even in those days of daring and successful

exploration. He had traversed the great waterway for more than 2,000 miles, mapping hundreds of miles of hitherto unknown country. He had established French influence among powerful tribes, and during these months of exploration he had not allowed any dispute with the natives to end in a quarrel. He had won his successes without taking a life or firing a shot. The French Navy may well be proud of such a man.

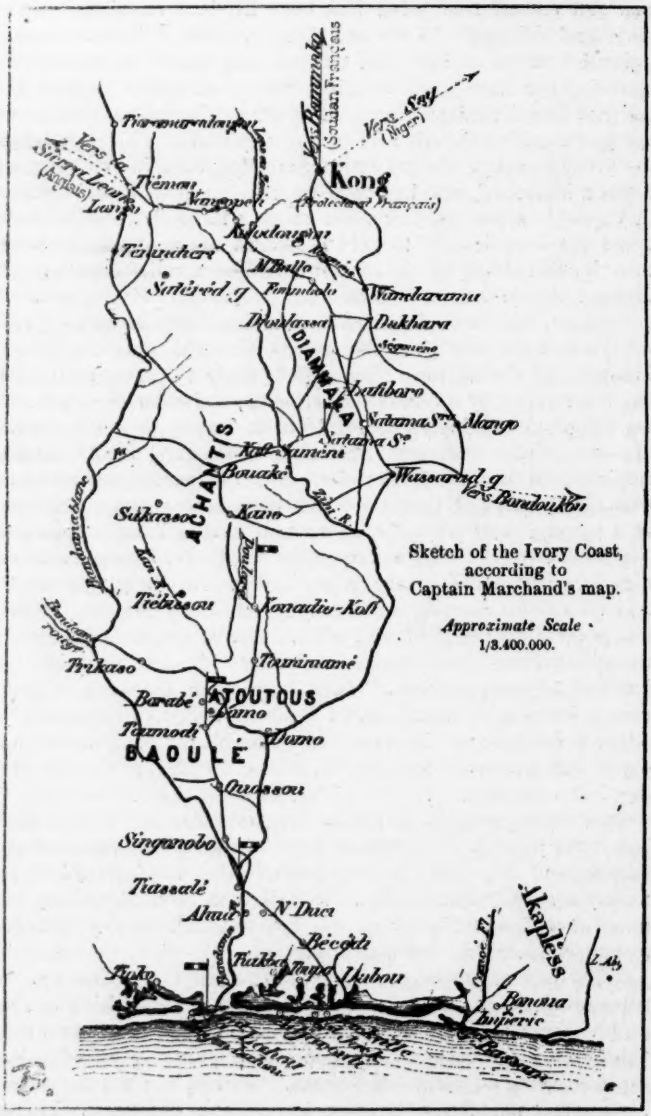
In a survey of this kind it is impossible to follow the precise order of time from year to year. It is simpler to tell the story of settlement and exploration in one district, and then go back to tell what had meanwhile happened in other parts of West Africa. We have seen how the French position at Timbuctoo was secured, and how it was made the base for Hourst's voyage of discovery. I must now mention another attempt to establish French influence on the Middle Niger, which had been made while Réjou was fighting the Tuaregs at Timbuctoo. Dahomey had been conquered by Colonel Dodds in 1892, and towards the close of 1894 it was made the base of operations of an expedition to the Niger. The boundary between the British colony of Lagos and the new French possessions had only been fixed up to the 9th parallel, and although in England it was held that by the agreement of 1890 the Niger from Say to the sea was British on both banks, there was a school of colonial politicians in France who held that south of Say, as far as the 9th parallel, the west bank was still unappropriated. In order to secure a footing in this debatable ground, and especially in the hope of obtaining a post on the navigable river below the falls of Boussa, M. Ballot, the Governor of Dahomey, secretly organised, in the winter of 1894, an expedition of some hundreds of carriers with an escort of Senegalese tirailleurs under Commandant Toutée. Marching from the Dahomey hinterland, Toutée reached on February 13th, 1895, a point on the west bank of the Niger, opposite Badjibo and some fifty miles south of Boussa. Here he built a fort, which he named Fort Arenberg in honour of one of the leaders of the French colonial party. He then collected a flotilla of eight boats, and passed the rapids of Boussa in the summer, and ascended the river beyond Say and Zinder, in the hope of gaining touch with his countrymen coming down from Timbuctoo. North of Say he found the Tuareg chiefs and their bands of veiled warriors in possession of both banks of the river, and levying tribute on the negroes and Fulahs. At first they appeared to be friendly, but near Zinder they attacked him, and he had to fight his way both up and down the river. After a short stay at Fort Arenberg on the way back he continued his voyage seawards, and soon reached the posts of the Royal Niger Company. Here he was given a hospitable reception, though the Company had made a protest against his occupation of the river bank near Badjibo. Our Government supported this protest at Paris, the French ministry yielded the point, and the Senegalese garrison was withdrawn from the fort, which was occupied by the Niger Company's forces, and re-named Fort Taubmann Goldie.

From this digression we must return to the main course of events in West Africa, and see what the chief enemy of French expansion, the Almamy Samory, had been doing during this advance along the Niger.

In Captain Pasfield Oliver's lecture the story was told of how he was driven south of the Niger, and in successive campaigns forced further east and cut off from what had been his best recruiting ground, the hinterland of Sierra Leone and Liberia. The brilliant campaign of Colonel Combes in 1893 had reduced him almost to extremities, and there is little doubt that he might have been finally defeated in 1894, had not Bonnier's digression to Timbuctoo diverted so much of French energy in another direction. Samory had withdrawn before Combes into the Kong country. It had only been lately occupied and surveyed by Captain Marchand, who had come up from the Ivory Coast. On hearing of Samory's approach, Marchand roughly fortified the town of Kong, urged the local leaders to hold it against the approaching Sofas, and then hurried down to the coast to organise a relief column. Colonel Monteil was just then disembarking at Loango with a force of 400 Senegalese, who were intended to anticipate Marchand's exploit of a few years later, and penetrate by the Ubanghi into the Nile Valley. Monteil had already fought successfully against Samory in the Soudan. He was recalled by the home Government, and ordered to proceed with his troops to the Ivory Coast and attack Samory in the Kong country. He was given to understand that while he marched inland through the tropical forests of the West Coast, another column would attack Samory from the Niger, and troops for this purpose were actually concentrated at Bogouni; but, probably on account of the disturbed state of the Timbuctoo district and the possible need of reinforcements in that direction, they never left the Niger Valley. All through these Soudan and West Coast campaigns one cannot help being surprised at the small forces put into the field by France. Her conquests have been won by the personal energy and initiative of a few white officers backed by mere handfuls of native troops. Tens have done the work of hundreds, companies that of battalions. I doubt if a French commander on the Niger or on the coast has ever had under his personal command on the day of battle a force equal to even one of the native brigades serving in our Nile campaign. This is all the more to the credit of the French officers, seeing what large results they have obtained with small means, but it was a policy that exposed brave men to disaster, disaster in which they showed the same soldierly qualities that so often had given them victory against desperate odds. In this case Monteil, without the promised diversion in his favour, was left to attack Samory in the African forests with less than 400 men on his side.

The column was organised on the coast at Grand Bassam. Before proceeding inland, Monteil had to deal with a local rising of the coast tribes. When at last he started in February, 1895, he could only put in the fighting line 345 rifles and two mountain guns. Samory had already captured Kong after a feeble defence. Part of the population were on his side and had taken no share in the resistance of the rest. He had then moved southwards to meet Monteil. On March 1st he came in contact with the vanguard under Captains Marchand and Desperles. Next day the French fell back a couple of miles to a more defensible position

where they held their own till Monteil came up with the main body. With his united force Monteil drove back the Sofas, occupied the town of



COLONEL MONTEIL'S CAMPAIGN.

Lafiboro, and next day forced the crossing of the Bé River. During the next week the column, encumbered with sick and wounded and only

keeping its porters together by ceaseless vigilance, pressed slowly northwards, through a difficult country, covered with wood, broken by low ridges and furrowed by watercourses. They were harassed day and night by the retiring enemy. Nevertheless, Monteil late in the evening of March 10th, seized by a *coup de main* the town of Dioulassou, where Samory had collected most of his stores for the campaign. This was a heavy blow to the Almamy, who sent envoys to negotiate. There was a two days' truce, but Monteil boldly demanded what was practically the unconditional surrender of Samory, and the negotiations were broken off.

But the daring soldier had resolved to attempt one more bold stroke to enforce the surrender of Samory. He had heard that the household of the Almamy, his wives, children, and slaves, were camped a few miles away at the village of Dabakala. On the very day the truce ended he started to surprise them by a forced march. But the Sofas were on the alert. Late in the afternoon the French were suddenly attacked on all sides in the woods near the village of Sokala. Formed in a small square the Senegalese and Haussas, under their French officers, fought steadily, beating off repeated attacks. At nightfall the battle ceased. The column had lost heavily, and Monteil himself was among the wounded. At dawn next day he began his retreat to the coast, harassed continually by the Sofas. Colonel Monteil, carried in a litter, retained the command, and whenever fighting began he was with the rear guard. Many of the porters had run away. Those that remained were mostly employed in carrying the wounded. For a fortnight the terrible retreat continued. It was not till March 29th that Samory abandoned the pursuit, and the remains of the column entered the Ivory Coast Protectorate. Monteil was recalled to Paris, and his operations were the subject of some harsh criticism. But whatever politicians may say, soldiers will hold that in the disastrous Kong expedition Colonel Monteil was not to blame for failing, and that the courage and resource which nearly wrested victory from superior numbers, and which saved his column from destruction in the day of defeat, mark him as a soldier of whom any Army might be proud.

This unfortunate expedition increased the power and prestige of Samory, and gave him a new lease of life. During the next two years no attempt was made to attack him, and there were even at times abortive negotiations with a view to induce him to become a vassal of France, and consent to accept a fixed frontier for his kingdom and keep his warriors from raiding beyond it. Meanwhile, the French colonial authorities were employing their resources in other enterprises. The Governor of the Ivory Coast was directed to confine himself to repelling any raids of the Sofas. On the Middle Niger, in 1896, Colonel De Trentinian increased the security of Timbuctoo by establishing a post at Ras-el-Ma. Flying columns patrolled the neighbouring routes to the northward, and protected the caravans in the immediate neighbourhood of the city. Beyond this radius of action they had to buy their safety by paying the time-honoured blackmail to the Tuaregs, or, perhaps we should say, they paid the traditional customs duties of the Sahara. To strengthen the line of communications the

Niger flotilla was increased in numbers; new posts were established on the river and its chief affluents; the telegraph system was extended, and steps were taken to continue the Soudan railway from Boufalabe to the Niger. Hitherto floods had frequently stopped the working of the line in the wet season. It was improved so that it could be kept open all the year round. At Boufalabé a fine bridge of fifteen steel spans, supported on piers of stone and concrete, was thrown across the Bafing River. It was opened by De Trentinian in the summer of 1896, and the laying of the line between Bafoulabe and Kita was begun. Through all the north and west of the French Soudan it was a time of peaceful development. The brigand raids of Tuareg and Fulah conquerors were a thing of the past.

But the directors of French colonial policy were thinking less of consolidating the position in the Soudan than of a still wider scheme of African empire. British expansionists cannot quarrel with Frenchmen for having, like themselves, dreamed of empire-making on a vast scale. And, like our own dreams of empire, those of France have been to a considerable extent realised. But, whether they succeeded, or whether they failed, we cannot refuse our tribute of admiration to the courage and enterprise of French soldiers and sailors devoted to the arduous task of realising with the scanty means at their disposal projects such as we have only ventured upon with the help of large armies. If they failed in part it was because the home Government expected them to perform impossible miracles. The central idea was to link together by new annexations, first, the countries of the Middle Niger and the French possessions on the West Coast, namely, Dahomey and the Ivory Coast Protectorate, connecting these last by occupying territory in the British and German hinterland north of the 9th parallel. Then by opening out the country already assigned to France north of the Say-Barua line, the region of Lake Chad was to be linked with the Soudan. The Chad country was again to be connected with the French Congo by expeditions based on the Ubanghi, and the difficult connection with Algeria was to be made by expeditions across the Sahara, to Timbuctoo on the one hand, and the Shari and Lake Chad on the other. There was even a bolder dream of pushing through the Bahr-el-Ghazal to the Nile, from the Ubanghi, and, with the help of a friendly Abyssinia, establishing French posts across the continent to the Red Sea. The dream of the Cape to Cairo was rivalled by another project of seeing French influence extended from the Senegal to Obok, and from the Mediterranean to the Congo.

I shall not attempt to follow in detail the story of the effort to realise these gigantic projects. I have specially to deal with what Frenchmen have accomplished in the last few years in Western Africa. And even here I shall touch lightly on those points where France and England were brought to the verge of conflict, for, like Captain Pasfield Oliver, I am chiefly anxious to bring before my colleagues of the Institution the splendid perseverance, the devoted courage, the endless resourcefulness of our rivals—may I not rather say, our comrades?—in the opening up of Africa. Looking back on the long record of soldierly

endeavour, may we not say to those gallant Frenchmen what Lord Kitchener said to Marchand at Fashoda, "I congratulate you on all you have accomplished"?

In 1894 M. Ballot had established numerous posts far into the hinterland of Dahomey. This process of gradual expansion inland was continued during the next two years, and in the campaigning season of 1896-1897 a determined attempt was made to occupy the debatable land on the Lower Niger from Dahomey. For this purpose three small columns were set in motion. On the left, north-westward, Captains Vermeersch and Baud marched on Wagudugu. In the centre Captain Gasnier marched on Say by the Atacora hill country, his line of advance being generally north; on the right a naval officer, Lieutenant Bretonnet, marched north-eastward on Boussa. There is no need to follow these expeditions in detail. Though the country was mostly claimed by England there were no British garrisons actually in possession. In most of the towns the local chiefs made submission to the new comers, gave the armed explorers a friendly reception, accepted their Tricolour flags and their other presents, and in return signed treaties acknowledging the French protectorate, often in careless disregard of the fact that they had already put their marks to similar documents recognising the overlordship of Great Britain. It is quite possible that in both cases many of them had no very clear idea of what they were doing. But the question of these conflicting treaties has happily now only an academic interest.

In some cases, however, the chiefs were hostile to their uninvited guests, and the little bands of adventurers had to fight their way over the mudwalls or through the stockades of a negro capital. At Wawa the capture of the village cost Bretonnet and his force of only a hundred Senegalese tirailleurs two hours of hard fighting. But at last he hoisted the Tricolour at Boussa on the Niger on February 6th, 1897. Say, higher up the same bank of the river, was occupied on April 25th. In the autumn Vermeersch, who had marched on Wagudugu in the previous winter, started from Upper Dahomey with another column, to reinforce the posts on the Lower Niger. On the way he traversed the district of Borgu, the country of the Baribas, and he had orders to hoist the French flag in their capital, Nikki. The French claimed that they had a right to Borgu in virtue of a treaty signed by the king on November 26th, 1894. They refused to recognise the validity of a treaty signed by the same king with Colonel Lugard just a fortnight before, and they were anxious to make a doubtful title good by actual possession. On November 8th, 1897, Vermeersch encountered the Bariba army at Guinaguru and routed them with a loss of 200 men. The French loss was slight, but Vermeersch himself was wounded. Nevertheless, he pressed on to Nikki, and hoisted his flag there on November 13th. The defeated king who had been represented as anxious for French protection, was a fugitive in the bush, and most of the townsfolk had fled with him.

Then came the anxious time when British and French troops were camped side by side in the disputed territory, and both countries were preparing to support by force their claims should the diplomatists fail to

arrive at a compromise. I need not follow the incidents of that crisis. I have already alluded to the mutual tact and good comradeship that prevented any local conflict. Early in 1898 there was a settlement by which we asserted our right to Boussa and the Lower Niger, while Nikki and the west bank from Say to Ilo were ceded to France. Thus much the enterprise of her soldiers had obtained for her, and the same settlement and treaties with Germany enabled her to link together Dahomey, the Soudan, and the Ivory Coast by means of a strip of territory north of Ashanti and Togoland.

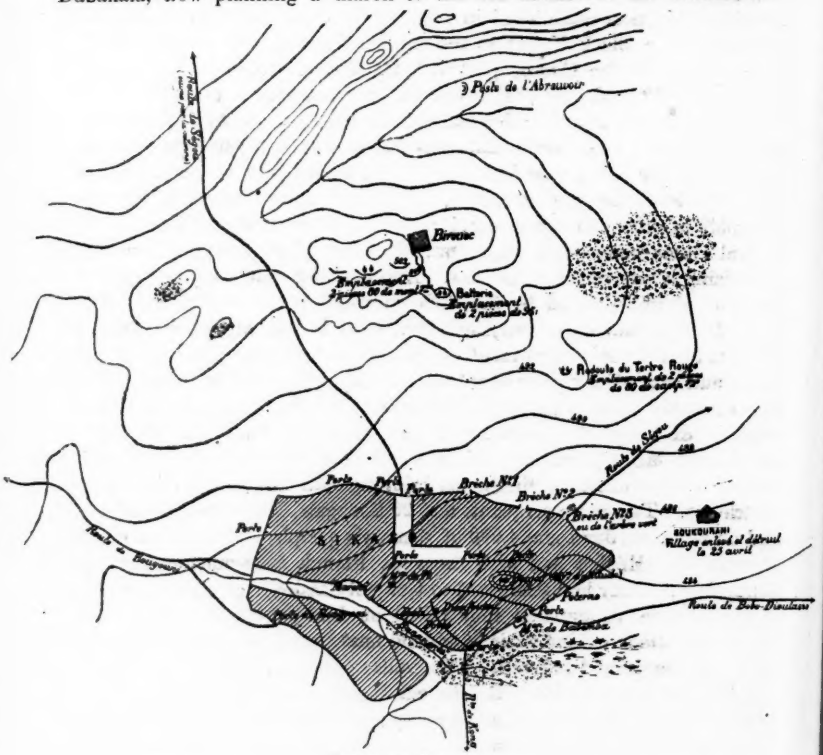
Once it became clear that the Lower Niger dispute would be peaceably settled, the French had turned their attention to the consolidation of their power in West Africa by the destruction of Samory and his powerful ally, Ba Bemba, the king of Sikasso. In 1897 they had made a last attempt to arrange terms with the Almamy Samory. They would not have done so if their hands had not been so full in other quarters, but they were rightly anxious to keep Samory quiet in case of fighting with their white neighbours on the Niger and the coast. The French envoys spent some time with Samory at Dabakala, near the scene of Monteil's defeat. They give a curious account of the barbaric splendours of his camp. He received them surrounded by a group of quaintly-clad jesters, grave-looking Mollahs, and splendidly-equipped life guards. These last were armed with Kropatschek repeating rifles. There were large numbers of these rifles in his camp. Most of them were of European make, but Samory pointed out with pride that several of them had been made by his armourers. Close examination showed that these native-made weapons were very defective. The barrel was not set true on the stock, the breech action was not gas-tight, the rifling was irregular, and the barrel was enlarged at the muzzle. But the wonder was that without machine tools even such weapons could have been turned out. There was a review of a small detachment of his troops. First came a body of cavalry just fifty strong, well armed and mounted. Next marched a battalion of infantry, all armed with repeating rifles, but with a strange variety in their uniforms. They went by twenty abreast in very good order, and it was noticed that the words of command were from the French drill-book, suggesting that deserters from the Senegalese battalions were among their instructors. The defile was closed by a body of nearly a thousand horsemen, four abreast, of whom about 200 carried rifles, the rest being spearmen. Samory said these were only his personal escort. He could put 10,000 more in line. In the midst of the negotiations the envoys learned that one of Samory's sons had surprised and massacred a small French expedition under Captain Braulot, at Bouna, near the Ashanti frontier. The Almamy protested that it was the result of some hideous blunder, but there was evidence that the unfortunate party had been received as friends, then treacherously attacked. The envoys were glad to get safely away from the camp. There could be no further negotiations. By the end of the year, as soon as the Soudan authorities felt their hands free, preparations were begun for dealing with Samory, and his ally the King of Sikasso was summoned to submit, and receive a French garrison at his

capital. Ba Bemba thought he could defy the white men. He had seen how their mountain guns tore a pathway for the stormers through the strongest stockade, but he had learned that a thick earthen rampart was a good defence against artillery, and he had fortified Sikasso with mud walls 18 feet thick, behind which he thought he was safe against any weapons the French could bring against him.

The first blow was struck before the French were really ready for the campaign. Two young officers, Lieutenants Demars and Méchet, were in command of a post established in 1897 in the valley of the Comoe (an affluent of the Black Volta) to the north of Kong. In January, 1898, Demars had left the Comoe post with the 2nd Company of Senegalese tirailleurs (118 rank and file), to make a reconnaissance towards Kong. As he approached the place he learned from native agents that Samory was encamped at Dabakala, and that Kong was held only by a small garrison of 300 Sofas, who had no idea an enemy was so near. Kong had once been the chief centre of population in the country. It was now half in ruins and almost deserted, but its position at the junction of several routes made it still important. Demars decided that the chance of seizing it was worth some risk. Approaching cautiously, he rushed into the suburb occupied by the Sofa garrison, and his tirailleurs shot them down as they came hurrying out of their houses at the first alarm. Demars then occupied and fortified a group of buildings just outside the town, and sent off a runner to inform his colleague of what he had done. On February 11th, a party of Sofas came in sight, reconnoitred the position, exchanged a few shots with the garrison, and retired. Next day, Lieutenant Méchet arrived with a small reinforcement of two French sergeants and nineteen tirailleurs, bringing with him a good supply of cartridges. Two more sergeants and 29 Senegalese came in on the 14th, and on the same day some 4,000 of Samory's people invested the place. Demars and Méchet had with them six French sous-officiers and 164 Senegalese. They had sent word to Colonel Caudrelier, who commanded in the Comoe Valley, that they relied on him for relief. Then they waited the attack behind their loopholed mud walls. For thirteen weary days they fought and suffered. The wells they dug only gave a scanty supply of bad water. They had to eat their horses and pack animals. Day and night bullets rained on the improvised fort, and more than once they had to beat off an assault. Attempts were made to seduce the Senegalese from their allegiance to their officers. From the trench that had been driven up near the wall, the besiegers called out to them that if they would kill the white men and open the gate, Samory would richly reward them. They replied with their Lebel rifles. Forty of the garrison were killed or wounded, three died of thirst, many lay ill in the hospital. Those who still manned the loop-holes were gaunt with hunger and fever. The water had failed, the last scrap of horse-flesh had been eaten, only a few biscuits remained, when to their delight the defenders of Kong heard the bugles and volley-firing of Caudrelier's column coming to the rescue. All who could still fight rushed out to join hands with their comrades. The Sofas fled to the southward, suffering heavy

loss in the fierce pursuit of the rescuing column. One may well doubt if the Tricolour ever flew over a braver band than this handful of heroes that held the mud walls of Kong.

Samory had not expected an attack while Sikasso was in the hands of his friend Ba Bemba. The losses of his troops before Kong had depressed and alarmed him. There were rumours of another attack coming from the southward. He wasted time now preparing to defend himself at Dabakala, now planning a march to his old haunts to the westward.



SIEGE OF SIKASSO.

Meanwhile Colonel Audéod, the Governor of the Soudan, had summoned Sikasso. His envoys were surprised and plundered by Ba Bemba's people on their way back and narrowly escaped with their lives, though the King of Sikasso had given them a safe conduct. The town was a strong fortress, and it was not till the middle of March that Audéod had got together what he considered a sufficient force for the enterprise. Sikasso was reported to be held by more than 10,000 men. The expeditionary force assembled on the Middle Niger and mustered ninety-five Europeans and 1,300 Senegalese and Soudanese fighting men. Even so it was the strongest column that had ever been assembled in the French Soudan.

For artillery there were a mountain battery of four guns, and a siege train of two guns of ninety-five millimetres, and two of eighty millimetres. For cavalry eighty Spahis under three French officers, and for the infantry six companies of Senegalese and Soudanese each mustering 200 rifles. It was the beginning of the summer season, when as a rule military operations were suspended in the Niger Valley. Ba Bemba did not expect a serious attack before November. Audéod's advance, which was made in two small columns separated by a day's march, was therefore unopposed till he was close to Sikasso, when he had to disperse some small detachments of Ba Bemba's people. On the 15th April he concentrated his force before the town.

To invest the place was out of the question. A regular siege had to be begun, the walls breached, and the place, carried by assault. Audéod occupied a rising ground about 1,000 yards from the north wall. Here he entrenched his camp, placed four of his guns in battery and opened fire on the 17th. During the next fortnight he steadily pushed forward his approaches, beating off several sorties of the enemy. On the 25th at dawn he surprised the outlying village of Soukourani. Including this action, there were fourteen engagements during the siege, and in these the attacking force lost eighteen killed and fifty-eight wounded, including three Europeans. Three breaches had been opened in the eastern half of the north wall. This was the main rampart, but it was known that there were two inner enclosures of less solid construction. Audéod trusted however that he would be able to blow in the gateways of these inner defences after the breaches had been stormed. On the 30th April he considered that the breaches were practicable, and he planned the assault for the last hour of darkness in the following night.

Possibly Ba Bemba got some hint of what was coming. However this may be, he arranged for a sortie against the French camp early on the morning of May 1st. The night was pitch-dark. At midnight the French artillery had begun a heavy bombardment of the town. At 4.30 the three assaulting columns, each formed of a company of tirailleurs, reinforced for the purpose from the other units, silently took up their positions in front of the breaches. At 5 the signal was given for the assault. The central breach was rushed immediately. On the right and left the enemy made a more dogged resistance, and the central column that had entered the town had to fight its way through the houses that were crowded together inside the rampart. At the same time a large body of the enemy issuing from the western side of Sikasso, swept round on the camp and tried to rush it. The sortie was met with rifle and artillery fire, and the enemy were charged by the Spahis. They fled in confusion round to the south side of the place. By 6 o'clock all the breaches had been stormed, the attacking columns were reinforced, and Major Pineau, Audéod's chief of the staff, went in by the central breach to direct operations. The French had to beat off several attacks from the west side of the town, while sapping forward through the houses. The second enclosure was forced, and there was a hard fight round the tower-crowned

mound in the east end of Sikasso. Still the attack pressed steadily on. But at noon, after four hours' fighting, though the north part of the place had been cleared of the enemy, the defenders were doggedly holding their own in the walled citadel at the south-east corner. Colonel Audéod now brought two of his guns into the streets, cleared a place for them, and breached at close quarters the wall of the citadel. At half-past two this inner breach was assaulted by a column 400 strong. An hour later all Sikasso was in the hands of the victors. More than a thousand of the enemy lay dead in the streets. About 200 of the column had fallen in the attack, including two European officers killed and four wounded. It was the heaviest loss that any French expedition had ever suffered in the Soudan.

On May 3rd, two days after the victory of Sikasso, Audéod despatched Major Pineau with 600 tirailleurs, 50 Spahis, and the four mountain guns to the southward, with orders to break up on the way any rally of Ba Bemba's people, and to reinforce the troops at Kong with a view to operations against Samory. On the 12th, Captain Benoit was sent off towards Kong by another route with a convoy of 600 porters escorted by 250 tirailleurs. Report said that Samory was trying to escape to the westward. Pineau's line of advance was directed on Tiémou, 60 miles to the west of Kong, where he would be in a good position to intercept such a movement. As he approached Tiémou he met and dispersed some small bands of Samory's people. On June 2nd, at noon, the column reached Tiémou. The village was on fire, and to the south of it there was an extensive camp that had just been abandoned. Some of the fires were still burning, and here and there were cooking-pots of half-boiled rice. Stragglers made prisoners by the scouts reported that Bilali, one of Samory's chiefs, had slept in the village the night before and had fled on the approach of the column.

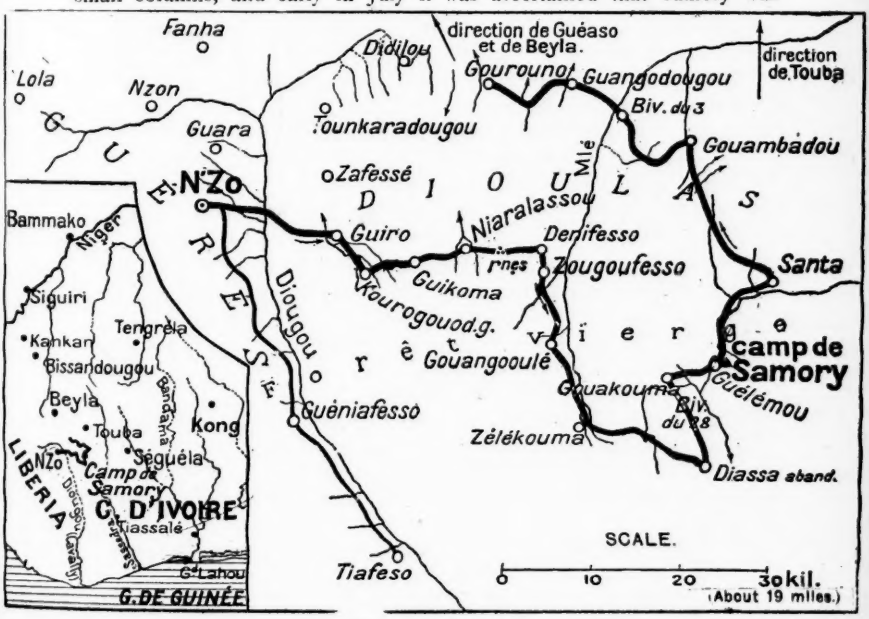
Pineau resolved to pursue the retreating enemy. He marched till sundown, picking up numerous stragglers. At sunset he halted and camped on a water-course, but an hour later started off with 200 tirailleurs and a mountain gun to surprise the enemy's camp. It was bright moonlight. The march led through broken ground, with a good deal of wood and many water-courses. Guided by the track of the enemy, Pineau came upon one of his outposts about 11 p.m. A group of Sofas were guarding the path. Most of them were cut down or taken, but one escaped to give the alarm. The tirailleurs rushed after him, and dashed into the enemy's bivouac firing as they came. Bilali's army broke up in wild panic. There was hardly a show of resistance. An enormous number surrendered, and the rest were pursued for two hours by the light of the moon. Next day Pineau rallied his column, and by a happy chance was met by the reinforcements under Benoit. The march was then continued to Kong.

When Pineau rushed the Sofa camp near Tiémou he hoped to capture Samory. But the prisoners reported that the Almamy, with the remnant of his followers, had already moved off to the westward. Bilali's army was following him, when Pineau's approach scared the Sofas from Tiémou·

The news of the fall of Sikasso had spread something like a panic in Samory's camps, and he was trying to make his way to the forest-land of the Liberian border.

While Pineau's column was marching south a message had been sent to Colonel Bertin, who had a force of 300 tirailleurs and two mountain guns in the Ivory Coast hinterland, telling him to move north-west and help in cutting off Samory's retreat. The message arrived too late, but Bertin's troops, under his second-in-command Major Lartigue, were used for the pursuit to the westward.

The end of June was occupied in reconnoitring to the westward with small columns, and early in July it was ascertained that Samory was



PURSUIT OF SAMORY.

Map showing the route followed by Captain Gouraud and his column.

camped near the village of Doué, on a river variously named on the maps, one of the western affluents of the Sassandra River. Lartigue sent his column, commanded by Captain Ristori, to Touba, north of Doué, to watch Samory, and himself proceeded to Beyla, further to the west, where he was in touch with the line of posts extending along the Milo River to the Niger. From these garrisons he proceeded to concentrate stores and supplies at Beyla. On July 20th, Ristori, with 250 men, made a reconnaissance in force at Doué. What precisely happened is not clear; but it seems that reckoning on the general demoralisation of Samory's forces he turned his reconnaissance into an attack. He stormed the village of Doué, but there was no panic in the Sofa camps. On the

contrary, they made determined attempts to retake the village, and when the firing ceased at nightfall, their camp fires were seen extending half-round it in a great semi-circle. Ristori abandoned the village and retired towards Touba under the cover of darkness. At dawn the enemy discovered that he had gone, and made a belated and feeble pursuit. After this Ristori contented himself with holding Touba and watching Samory, till Lartigue was ready to strike at him from the north-west. On August 1st, Samory sent a letter to Ristori asking for negotiations. In order to gain time evasive answers were sent back. But in the second week of August Samory broke up his camps near Doué and began to move slowly westward through the forest. His object was to reach, if possible, Liberian territory. Lartigue now despatched a column from Beyla to the village of N'zo, on the Diougou or Upper Kavally River. N'zo was the chief village of the Gueres or Weres, a cannibal tribe of the Upper Kavally, who showed themselves willing to co-operate as scouts and guides in cutting off Samory's retreat. The special mission of the column, commanded by Captain Gaden and Lieutenant Woelfell, was to watch the river below N'zo and prevent Samory getting to the west bank.

In the first week of September the scouts brought news that a small party of Samory's people had attempted to ford the river at Gueniafesso, but had been repulsed by the Gueres on the spot. Gaden at once moved out to Gueniafesso and sent scouting parties along the river. On the 8th came news that an immense multitude of Samory's people, fighting men, slaves, women, and children, were crossing the river about fourteen miles away at the ford of Tiafesso. Woelfell was at once sent off with a company of Senegalese. Captain Gaden followed with the rest of the column, namely, another company, and the porters and baggage. The march was slow and difficult. Most of the way it followed a narrow track through the forest, crossing numerous marshy streams under a downpour of rain. At 8 o'clock on the morning of September 9th a Sofa straggler was captured, and said that the camp was not far off, and that the enemy had no idea the French were so near. Towards 10 o'clock, the advancing column, only 200 strong, came upon the Sofa outposts, drove them in with a bayonet charge, and then the camp was in sight.

Evidently no serious attack had been feared. Some 20,000 slaves and women and children were crowded together in a huge bivouac. Some were cooking, some building shelters, the slaves were carrying in bundles of baggage and stores brought up from the ford. Beyond the camp, on a rising ground was a guard of 1,800 Sofa riflemen. Woelfell at once attacked. Pushing quickly through the camp, where the slaves and women fled right and left to clear the way, he extended his company, and began to move up the height beyond, firing on the Sofas. But they had no heart for a fight. After a few shots they began to throw down their weapons and signal that they wished to surrender. The "Cease fire" sounded, and Woelfell, having secured the ford, waited anxiously for Gaden's arrival. The rest of the column came up just in time to receive the surrender of some thousands of Sofas, who having fled at the first alarm, came in with their chiefs to submit.

appeared that Samory, expecting only pursuit from the north-eastward, had sent over the river not only his vanguard, but a considerable number of slaves and camp followers with an immense quantity of stores and ammunition. Woelfell's surprise attack had cut off the vanguard from the main body. Captain Gaden thought at first of not merely blocking the ford, but of crossing to pursue Samory, who was reported to be retiring into the forest. But the ceaseless rain that was swelling the Kavally and all its tributary streams would have made movement difficult, and he had besides to think of securing and feeding the multitude of prisoners he had on his hands. Therefore he left a post at Tiafesso and returned to N'zo, sending his prisoners northwards to Beyla in a succession of small columns under escort. Despite every effort to obtain food for them they were in a half-starving condition till this dispersion was completed.

Samory had taken refuge in the hilly wooded country north-east of the Diougou. A column of 200 tirailleurs under Captain Gouraud started from N'zo on September 24th, with orders to capture him if possible, and if he escaped to drive him towards the Ivory Coast. If he doubled back towards the Diougou the detachment at N'zo would intercept him.

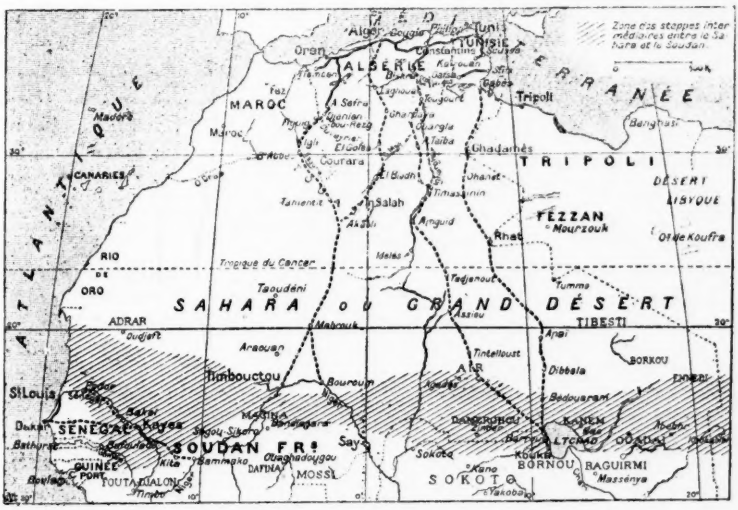
For six days, Gouraud and his tirailleurs tramped through the dripping woods, forded the swollen streams, and bivouacked under the pouring rain. An attempt to find shelter in the ruined villages had to be given up, for in the houses were the festering corpses of wretches who had starved to death, or had been murdered by the plundering Sofas. Gouraud was soon on Samory's track. He picked up numerous stragglers, many of them in a dying condition. He found three cannon left at the crossing places of swollen water-courses. On the evening of the 28th he learned from his scouts that Samory was camped in a hollow only a few miles away.

The 29th was a fine sunny day. Before dawn, Gouraud had formed up his little force. He had divided it into five sections: one was to guard the porters and baggage; another, under Captain Gaden, was to make the dash into the enemy's camp; a third, under Lieutenant Jacqmin, was to seize the outlet from it on the far side; the two remaining sections were to follow as a support. He impressed on his men that the one object in view was the capture of Samory. If there was a fight, he would escape into the forest. Everything depended on his being seized by surprise in the midst of his army. Not a shot was to be fired without orders; the advance was to be silent, with bayonets fixed, and everyone ready for the rush into the centre of the camp, where it was reported that Samory's hut was erected apart from the rest. At dawn a half-sleepy outlying piquet of the enemy were surprised, and cut off from the camp. They surrendered without firing a shot. The march then continued through scattered trees and long grass that rose to the height of the men's heads.

The track sloped down to a small stream. Near the ford some women were filling water-jars and washing clothes. The interpreter called out to them not to move or cry out, and they would be safe. The

leading section crossed and doubled through the grass beyond. The rear guard halted at the ford. The rest pressed on. They were entering the hollow in which lay the camp. Samory's people were resting in careless security. The women were cooking breakfast, the men resting in and round their grass huts. Lieutenant Jacqmin with the leading section was boldly doubling through the camp, anxious only to reach its further side before the Sofas could recover from their surprise, when in front of him he saw a tall old man, in a long robe seated in a folding chair at the door of an isolated hut, with a Koran open on his knees. As he saw the bayonets of the vanguard coming, the old man sprang up and began to run. It was Samory. There were several rifles loaded in the hut, but he was so surprised that he forgot any idea of resistance. His one idea was to get into the bush and then reach a party which was camped a few miles to the east under the command of his sons. But the tirailleurs were close after him. He ran for about four hundred yards, dodged the first man who tried to catch him, and then stumbled and was seized by a French sergeant. He told the men who he was and begged that they would kill him. Lieutenant Jacqmin came up, and the prisoner was marched back into the camp. There they found Gouraud with the other three sections formed in line near the royal hut. The men had their rifles loaded, and round them the Sofas were gathering, with arms in their hands, but hesitating to attack the daring band that had suddenly appeared in the midst of them. Samory was hurried into the square, and with a revolver to his head he was told that if his people attacked he would be the first to die. Anxious as he had been to be killed a few moments before, he now begged for life, and called out to his body-guard to submit. Some of the chiefs immediately threw down their weapons, and then began a wholesale surrender. Rifles, cartridges, spears, were piled in heaps before the Senegalese. Almost immediately Gouraud heard of the other Sofa camp, under the Almamy's sons. He could not detach any of his small column to capture it by force, but he obtained its surrender by promising Samory that if his sons would come in their lives should be spared. Gouraud gave the promise reluctantly, because among the chiefs of the other band was Saratieni Mory, who had murdered Captain Braulot and his companions. But the chance of the murderer escaping was in any case considerable, and the risk of being attacked by some hundreds of Sofas armed with repeating rifles was serious, now that the column had many thousands of prisoners to guard. Samory wrote a message bidding Mory and the other chiefs surrender. It was sent off in charge of one of the captured Sofa leaders with a French officer and a section of Soudanese for an escort. After some debate the sons of Samory surrendered, and were disarmed and brought back prisoners. After destroying most of the captured ammunition and arms, Gouraud began to march with his prisoners towards Beyla. He luckily found a large herd of cattle in the camp, and this diminished the difficulty of his commissariat arrangements. Amongst the captured booty was Samory's treasure, amounting to over 200,000 francs in gold.

Samory and his sons were deported to the French Congo, and thus fell the last of the native chiefs who had disputed with France the dominion of the Western Soudan. It was sixteen years since he had first met the French in battle on the Upper Niger. The conquest of the countries within the bend of the great river was now complete. Henceforth, the French garrisons would be needed chiefly for police duties. In the present year the French Government has marked the close of the period of conquest by transferring the greater part of the Soudan from military to civil administration. Timbuctoo and the districts of the north-east have, however, been left to the military authorities, for here the garrisons have to be kept on a war footing to



THE PROPOSED RAILWAY LINES OF THE TRANS-SAHARA.

guard against the possible raids of the restless Tuareg tribes of the desert and the Middle Niger Valley.

In conclusion, I must say a few words about the efforts that have been made to link the French conquests on the Niger with Algeria and with the basin of Lake Chad. Long before the conquest of the Western Soudan had even begun there were projects for penetrating from Algeria to Timbuctoo by the oases of the Sahara. The advance of the Algerian railway system to the edge of the desert south of the Atlas at Biskra and Ain Sefra, the discovery that the oases were of considerable extent and that the great desert was peopled by many tribes, and finally, the steady advance along the Niger on its southern side, all gave a new impulse to the idea of a Trans-Sahara Railway. The destruction of Colonel Flatters' Expedition in 1881 checked for a time the efforts to penetrate into the desert and overcome the persistent hostility of the warlike Tuaregs. But five years ago the enterprise was resumed by M. Foureau. He began by making a reconnaissance each year of the northern border

of the Sahara beyond the southern outposts of the French in Algeria. These outposts have recently been pushed forward beyond the old military frontier. In these journeys he opened up friendly relations with certain of the Tuareg tribes, and obtained from them detailed information as to the trade routes radiating from Amguid to Timbuctoo and Lake Chad. I may mention that this year the gold medal of the Royal Geographical Society was awarded to M. Foureau for his exploration of the Sahara. In the summer of 1898, after the conclusion of the Anglo-French agreement which recognised the extension of the French sphere of influence to the northern shores of Lake Chad, he arranged with the Algerian Government an expedition on a larger scale that had yet been attempted. The column was organised at Biskra, in the autumn of 1898. The first reports were that it was intended for the occupation of the great oasis of Tuat in the hinterland of Morocco. But its first object was to reach Amguid, and then push on either for the Niger, or by the oasis of Air to Lake Chad.

M. Foureau was accompanied by four other civilians, and had a military escort under the command of Major Lamy, which included six officers, two companies of Turcos, 12 Spahis and two mountain guns, in all there were over 300 men, with 1,200 camels. The column left Biskra on September 24th, 1898, and marched by Tuggurt and the Wady Ighaghar to Amguid. It then took the direction of Air. Caravans arriving at Tripoli have brought reports of its massacre by the Tuaregs, but although it must have had some hard fighting it seems probable that the reports were false, and that early in last summer it was at Air, and was about to move on to Lake Chad.

It was to have joined hands with another large expedition which left Say on the Niger on January 2nd in this year. This expedition consisted of 20 Spahis, 250 Senegalese and Soudanese tirailleurs, and 1,000 porters, under the command of Captains Voulet and Chanoine. They were to march through the country north of Sokoto to Lake Chad. In the spring, on account of reports that reached Say as to Voulet's proceedings, Colonel Klobb was sent from Kayes to take over the command of the column and send Voulet back under arrest. He overtook the column at Zinder on July 14th and was shot dead by Voulet's tirailleurs. We do not know enough of the circumstances to enable us to fully discuss this most lamentable affair. To speak as some have spoken of Voulet's crime as the act of a typical French colonial officer, is to offer calumnious insult to brave men. There is something to be said for the theory that Voulet had been for some time insane. However this may be, he and his colleague Chanoine have since been killed by their men, and the remains of the column having retreated towards the Niger has, I believe, surrendered to the French authorities.

This was the second attempt to reach Lake Chad by the Say-Zinder route. An exploring expedition under Captain Cazemajou was massacred near Zinder in the spring of 1898. Other attempts have been made to reach Lake Chad from the Congo, or rather, from its northern tributary, the Ubanghi. In 1897, M. Gentil succeeded in conveying a small steel

launch overland from the Ubanghi to the Shari River. He paddled it down the Shari to Lake Chad, and hoisted the French flag on the lake. He made a treaty of friendship with the negro Sultan of Baghirmi, and returned to the Congo. He was appointed French Resident in Baghirmi and Administrator of the Shari region, and last summer made arrangements for a series of expeditions which were to secure possession of the territory he had nominally acquired in his first journey. Lieutenant Bretonnet, who hoisted the French flag at Boussa in 1897, was in command of one of these expeditions. He was to establish military posts on the Lower Shari and on Lake Chad. Another expedition, which had more of the character of an exploring and commercial mission, was under the command of M. Behagle. In July last Bretonnet's party was massacred by an army of some thousands of Rabah's people. Rabah himself is said to have been in command. It is also reported that Rabah captured Behagle's party, and that its leader has since died in captivity. The last news from M. Gentil was that he was on the Upper Shari. Rabah has overrun Baghirmi and Bornu, and is in possession of all the southern approaches to Lake Chad, and can also interrupt the western approach from the Niger. The former slave of Zobehr now commands the most formidable fighting force in Central Africa. Our Protectorate over Sokoto makes him our neighbour, but he is more likely to be embroiled with the French on the Ubanghi than with us. The French Government has recalled what remains of the Chad expeditions, and has for the present given up all plans of expansion in that direction.

On the desert frontier of the French Soudan a camel corps has lately been formed (another has done good service for years on the Algerian border). A small expedition, with an escort of camelry, penetrated this year to the oasis of Arouan, about 160 miles north of Timbuctoo. Messieurs Copolani and Argaud were in command. Arouan had only twice before been visited by a European, the explorer René Caillié in 1826, and Dr. Lenz in 1880. It is, by all accounts, a miserable spot, only important as a halting-place for the caravans to and from Timbuctoo. The expedition is notable as a first effort to penetrate the Sahara from the Niger. I expect that now the conquests of Rabah round Lake Chad, and the movement of the Senussi centre of action from Siwas to the hinterland of Tripoli have made it more difficult and dangerous to attempt expeditions in the Eastern Sahara, the efforts of French military explorers will be directed to joining hands between Timbuctoo and the Algerian frontier posts across the oases of the western desert. On the northern borders of the Sahara the French have done splendid work in tapping the underground streams and reservoirs, and extending the oases. In one of them, in the Wadi Ighaghar, where forty years ago there were a score of palm trees, there are now 50,000. Possibly, the same system may prove to be practicable in the southern part of the desert.

I hope this rapid survey of what the French have done in West Africa in the last few years has not been uninteresting. Before I conclude, I must touch on one point more. I shall perhaps be asked if these conquests in the French Soudan are ever likely to return a money profit.

I must say that the reply is that the money balance will probably be on the wrong side for many a year. As in our own part of the Soudan, so in the region south of the Sahara, we cannot expect any considerable trade to grow up till the country has had time to recover from a long period of war. But meanwhile it seems to me that we may say that both in the Soudan of the Nile and the Soudan of the Niger there is already a solid gain that no sum of pounds or francs can measure—the gain of having replaced continual war by peace and security, of having put an end to slave raiding, of having laid the foundations of order and civilisation. It is something that a traveller can now journey without an escort from Kayes on the Senegal to Timbuctoo in the heart of Western Africa; that the villagers of the Central Niger no longer fear the raids of the Tuaregs; that the organised brigandage of Samory and his Sofas has become only a horrible memory to the peoples between the river and the sea.

I am sure that no thought of national rivalry will prevent us from paying our tribute of admiration to the brave men, who, with their handfuls of native followers, waged the twenty years of warfare by the great river and in the desert, the swamp and the forest—the long warfare that made all this possible. As the borders of our own Empire are marked with the graves of our dead, so the stages of this advance from the Senegal through the Niger lands are marked by the lonely crosses on the wide scattered graves of those soldiers of France. Glancing back on their records we may well forget for a moment the rivalries, the divisions of European politics, and think of them as like our own gallant dead who lie in the African deserts, brothers in a common work, sons of the conquering white race, whose mission it is to establish the reign of civilised law, and to bring light into the dark places of the world.

CAUSES FOR THE ADOPTION OF WATER-TUBE BOILERS IN THE UNITED STATES NAVY.[1]

By GEORGE W. MELVILLE, Engineer-in-Chief, U.S.N., Vice-President.

IT has been a number of years since I have had the honour and pleasure of addressing this society. Speaking generally, the progress and design of machinery of war-ships has been, during that time, along such well-developed lines, and so in accordance with the generally accepted theories of designers, that there has been little to say. More recently, however, in order to keep pace with the times and to cope with the necessity we have always before us of securing ships that will be in nowise inferior to those built for any other nations, a change in machinery design has been made that at first glance appears radical—the general adoption of water-tube boilers for all new vessels of our Navy.

Elsewhere violent diatribes have been launched against those responsible for a similar decision, and I am aware that there exists a not inconsiderable sentiment in this country against water-tube boilers. I call it a sentiment advisedly, because I believe that much of it is due to the attachment that engineers have for their old and proved friend, the cylindrical boiler.

Only a part of the opinions unfavourable to the change arises from the natural and proper conservatism of naval architects and marine engineers, but these demand answer. Flooded always with new devices, or rather by rejuvenated failures in new forms, we find a very small proportion that is even worthy of a trial, and where a new mechanical idea is tried on shipboard, so much time is spent in adapting it to naval conditions and in repairing its failures that each of us becomes naturally and properly dubious when any change is suggested. Any important change in design, even of the apparently minor fittings of ships, may involve such risk to vessel and crew as to be unjustifiable, unless the device be thoroughly tried beforehand. Many apparently good ideas have given successful results on shore only to fail dismally at sea. I think that it may be given as a general rule that no change in design should be authorised that has not already been successfully made.

Of course, a strict application of the foregoing rule would lead to stagnation. Here, however, enters the designer. His *rôle* is an important one. He has to cull the good points from previous work, and, if he be a good designer, he must also leave out the bad points. There always are some bad points, but amelioration of conditions should be the aim of naval designers. This implies that a good designer must be of vast experience and of extended observation. The larger his field of

[1] Read at the seventh general meeting of the Society of Naval Architects and Marine Engineers, held in New York, November 16th and 17th, 1899.

observation, the more valuable his conclusions. It is the details that count. No man can succeed as a designer of war-ships without the most careful attention to small things.

The modern battle-ship is a monument to the greatness of the *minutiæ* of design. It has been gradually built up from the sailing beauties of a century ago. Steps in advance have been slow, generally speaking. We cannot advance by leaps and bounds in marine work. Here genius is hampered by such conditions as make any step in advance a great achievement. Of course, we have the case of Ericsson and the "Monitor," but this was a case not only of special conditions but also of a most exceptional man. Naval architecture is a pyramid, each stone of which is supported by all of the preceding ones. The size of the stone that one man can add to the pile depends, of course, upon his ability, but more especially upon his work. By hard work and by paying attention to what is going on around him any man can add his quota, but "those who, having eyes, see not; and who, having ears, hear not," are worse than useless.

The task I have set myself to-day is no mean one. I desire to show that the decision to use nothing but water-tube boilers in our future war-vessels is a step in advance, and that it is a natural step toward the evolution of the perfect fighting machine. I desire to show that it is no radical change, and that it does not involve the use of anything but a tried, successful, and reliable apparatus that gives us positive and great advantages over the character of boilers heretofore generally used. I desire not to minimise the disadvantages following this change, but to show that these disadvantages are not only not insurmountable, but, for war-ships, they have already been overcome.

In the first place, I want to state that water-tube boilers are bad in principle. They carry the pressure inside their weakest parts, the tubes. A failure in a tube is followed by the opening of a fault, sometimes to a dangerous degree. In a fire-tubular boiler, on the contrary, the pressure would continue to close a split tube. It is true that a failure of a boiler-tube generally comes from pitting, where fire-tubular boilers generally have such a great advantage, as in cases of split tubes. Yet failure of tubes is the most common defect in all boilers, and a proper design would place the pressure on the outside of the tube. Water-tube boilers are, from their very definition, designed from a wrong principle, not only because of the direction of application of pressure upon the tubes, but also on account of the decreased amount of water in the boiler, of the increased difficulty of observing a leak, and of the decreased value of heating surface in water-tube boilers. For this reason, as an engineer, it is with some misgivings that I state that I consider water-tube boilers tactical necessities for war-ships.

Builders of water-tube boilers use solid-drawn tubes almost exclusively for marine work. This, of course, decreases the danger of split tubes, but it does not change the mechanical principle. Some day, probably not in my time, we may hope to have a boiler having fire tubes, and having the advantages of water-tube boilers. Such a boiler

would force its way at once into all Navies, just as water-tube boilers are doing at the present day.

Disbelieving, as I do, in the cardinal principles of water-tube boilers, I have sturdily opposed their adoption by our Navy until now I am convinced that they must be used if we are not going to content ourselves with inferior ships to those built for other nations. Of course, during the period of development of the design of water-tube boilers, that even now continues, I have, in my official capacity, kept track of and taken part in the world-wide experiments with their use. Water-tube boilers have advantages, and I have never been blind to them. Two years ago I stated that their disadvantages had been sufficiently removed to justify their use on our war-ships. Now I consider that the value of their advantages has been sufficiently developed to necessitate their use if we do not wish to be left behind in naval design.

The principal thing to which I desire to call attention is the fact that all vessels are essentially compromises. Any ship must be considered in its entirety, and the advisability of a change in design of any part must be determined from its effect upon the ship as a whole. Whether or not water-tube boilers are superior to cylindrical boilers as boilers simply, if there be a beneficial effect upon the ship as a whole due to the adoption of water-tube boilers, these boilers are essential to the best design.

The necessity of compromise in ship design must be self-evident to the members of this society, who have the problem before them for solution almost daily. Taking the particular case of war-ships, the size of our ships is limited by their draught. We are building vessels now that are as large as any that can enter our harbours and docks, and we cannot, therefore, increase their power as fighting-ships except by improvements in design. Any increase in weight allotted to one essential of the efficiency of the ship must be counterbalanced by a decrease in some other, perhaps equally essential element. So far, this has most frequently been done by robbing the coal pile; an extra gun, a half knot in speed, or an additional inch in armour protection—each means a few tons loss of coal in the bunkers. I must except the more recent design of battle-ships from the above general rules. The importance of coal endurance has become more and more manifest, and it has been appreciated fully in our recent designs. Incidentally, these last ships are fitted with water-tube boilers.

Water-tube boilers are considerably lighter than those of the old type, and their effect upon ship design may be given as follows:—Of two ships having all other qualities identical, one fitted with cylindrical boilers and the other with water-tube boilers, the latter will be somewhat the smaller and handier—will have somewhat less draught, and will cost less.

Limited, as we are, in the size of our war-ships, by their draught, I think that the foregoing shows that for a maximum of fighting efficiency we must use water-tube boilers. The designing engineers of our naval vessels are limited in weight and space. They save little or nothing in

space perhaps, but they save greatly in weight if they adopt water-tube boilers. If these can be successfully operated on shipboard, they must be used because of their decreased weight. The foregoing is entirely apart from any consideration of the relative merits of water-tube and fire-tubular boilers, but it is conditional upon the possibility of the successful operation of water-tube boilers.

Before considering claimed advantages and disadvantages of water-tube boilers, I desire to give a few historical facts, most of them already well known to the members of this society.

The old Martin boiler was the first water-tube boiler ever used in any naval vessel. We had good success with these boilers, but they died out of use with the introduction of high-pressure multiple-expansion engines and the consequent cylindrical boilers.

For years none but water-tube boilers have been installed in our steam launches. These have always been attended by unskilled labour, yet the results have been very satisfactory. Some accidents have occurred, but they have been very few, probably no greater in number than if fire-tubular boilers had been used, and it is to be noted that the results of a boiler explosion would probably have been worse in almost every case if the failure had occurred in a fire-tubular boiler.

Torpedo-boats and destroyers in our Navy have always, since the time of the "Cushing," been equipped with water-tube boilers of various types. Small bent tube boilers have generally been used. There have been some cases of sad accidents in the fire-rooms, generally due to carelessness in manufacture, and particularly in tube setting, but not to defective design. The boilers have proved to be quite as reliable as the extremely light engines of these boats. With the small amount of skilled attention it is possible to give torpedo-boats, and considering the character of service demanded of these small craft, I think that no engineer will to-day question that the use of light water-tube boilers, with the higher speeds possible as a result, adds to their efficiency and security. I think even Herr Schichau has come to be of this opinion.

The first large installation of water-tube boilers in our Navy was on the "Monterey." Indeed, at the time, this was the largest installation of water-tube boilers in any Navy. In this monitor, as you all know, there are four round Ward water-tube boilers, with two cylindrical single-ended fire-tubular boilers. The water-tube boilers have been satisfactory. It is worthy of note that there has been very little difficulty experienced in maintaining a steady water-level, although the boilers have a very small amount of contained water. Tubes have failed by pitting several times, though never with any danger to the firemen. The water-tube boilers have been twice re-tubed by the ship's force without laying the ship up at any Navy yard. On one occasion, probably with a view to thoroughly testing the water-tube boilers, or to satisfy the unholy desires of some person decrying water-tube boilers, the ship made a voyage of about 8,000 knots, largely under forced draught, and, whenever possible, with all boilers in use. There was no resultant injury to the water-tube boilers, which performed well throughout the trial. The

combustion chambers of the cylindrical boilers came out of the trial badly bulged.

The Yarrow boilers of the "Nashville" have operated fairly successfully, though they cannot be said to be completely satisfactory on account of the amount of trouble given by bulging of drums and by leaky tubes.

The first set of copper tubes has been replaced by others of steel to considerable advantage. I believe that the latest designs of this type of boiler provide for the use of slightly curved tubes next the fire. This ought to be advantageous.

The "Marietta's" trip around South America, at the beginning of the war with Spain, was quite as successful as was that of the "Oregon." The first ship is fitted with Babcock and Wilcox boilers, the second with cylindrical boilers. No repairs were required to either set of boilers after the completion of the trip.

The "Annapolis" is also equipped with Babcock and Wilcox boilers, and here, as on the "Marietta," these boilers have been thoroughly successful. Indeed, a former chief engineer of the "Annapolis" has stated to me that the boilers of that ship were easier to manage in use and easier to maintain in a state of high efficiency than are cylindrical boilers.

The "Chicago" has several Babcock and Wilcox boilers, and these have so far worked in a thoroughly satisfactory manner, no failure being reported under any circumstances.

The foregoing represents the tried installations of water-tube boilers, in ships larger than torpedo-boats and destroyers in the United States Navy. Babcock and Wilcox boilers of the shore or stationary type were installed in the old monitors "Canonicus," "Mahopac," and "Manhattan," the old rectangular boilers being entirely worn out and it being deemed advisable to fit these old boats for whatever service they could do. The change was commenced at the beginning of the Spanish war. Before its close the change was complete and a somewhat greater speed was attained than with the original boilers. This change was made without injuring the decks of the monitors. The old boilers were cut up and passed out through the smoke-stack, down which the parts of the new boilers were passed, the latter being assembled in the engine-room space. This is an instance where none but water-tube boilers could have been used, and where every facility of repair and installation was of enormous advantage. For naval vessels with their protective decks the facility with which water-tube boilers can be removed or completely renewed without disturbing the decks may, of itself, justify us in adopting water-tube boilers.

There are building and repairing several other ships of our Navy to be fitted with partial or complete outfits of water-tube boilers. These include the "Alert," "Atlanta," "Cincinnati," "Wyoming" (Babcock and Wilcox), "Main" and "Connecticut" (Niclausse), "Missouri," "Wisconsin" and "Arkansas" (Thornycroft), and "Florida" (modified Normand).

The foregoing gives the installation of water-tube boilers in our Navy from which *data* has been obtained. So far as tried the boilers have invariably been easy of operation, though I have found more skill required to obtain the best results from these boilers than would have been necessary if cylindrical boilers had been used. Particular attention has been given in all cases to the feed arrangements. Water-tube boilers must have ample feed pumps, and the regulation of the feed must be easy. At first the heating surface of water-tube boilers was made 3 square feet per H.P. against 2 square feet necessary with cylindrical boilers. This figure has been gradually reduced until now we are down to 2·4 square feet of heating surface per H.P., about as low, I think, as it is yet safe to go with water-tube boilers.

The economical results from water-tube boilers were at first not particularly good. At present we get quite as good results from water-tube boilers of the latest design as from the best cylindrical boilers. The ratio of heating surface to grate surface has been kept up to at least 40, although we do not yet feel warranted in allowing as small grate surfaces in water-tube boilers as in cylindrical boilers. Water-tube boilers lose in efficiency when forced, especially those of the straight-tube type. Of course this is not of very great moment to us in a naval vessel which is under forced draught only at maximum speed, but it is nevertheless a disadvantage.

The following table shows the relative economy of cylindrical and water-tube boilers.

The increased grate surface we have required with water-tube boilers will be a positive advantage to our ships' steaming qualities. I consider that sustained sea speed depends largely on the grate surface. Heating surface, of course, must be provided, but I should prefer an excess of grate surface to an exceedingly high ratio of heating surface to grate.

—	Annapolis.	Marietta.	Newport.	Princeton.	Vicksburg.	Wheeling.
Type and number of boilers	(2 B. & W.)		(2 single-ended cylindrical)			
Displacement, tons	1,000	1,000	1,000	1,000	1,000	1,000
Knots per ton of coal at most economical speed	26·38	22·27	18	19·6	21·25	16·6
Number of screws	1	2	1	1	1	2
Grate surface, square feet	98	94	78	78	78	60
Heating surface, square feet	3,620	3,664	2,524	2,524	2,524	2,508

Up to this time we have had no trouble from salt water or grease in water-tube boilers. Indeed, we could hardly be more troubled by salt water with this type of boiler than we have been with cylindrical boilers. We suffered severely in our short war with Spain from dropped furnaces in cylindrical boilers. I do not think that a properly designed water-tube boiler will give more trouble from the use of impure feed water, such as sometimes we must have at sea, than any other boiler. I do not think

tubes more liable than furnaces to fail from a deposit of scale. In any event, the evaporating plants of all our ships are being made adequate to give fresh feed water. The only danger of salt water in the future should come from leaky condensers.

Glancing abroad for a moment we find every modern naval Power from England to Japan, committed to the use of water-tube boilers on the largest scale. Each of these countries has had its experience, and each has decided not only that water-tube boilers can be worked, but also that they work well and that they must be used in naval vessels.

I will give a few observations on the working of various types of water-tube boilers abroad. The result of a first glance would seem to be that anything would do to make steam, from Watt's tea-kettle to the most complicated of modern steam generators. I know of one French boiler (you know what ingenious mechanics the French are) composed equally of water and fire tubes. The tubes were concentric and the distance between them but one millimetre. Of course the amount of water is very small—so small as to put this boiler in the class called by the originators "inexplosible." This boiler was tried at the works of the makers with good results. It was next tried in a torpedo-boat with equally remarkable results—7 men killed, I believe.

We have read of explosions, however, of really well-designed water-tube boilers. Generally it is found that a tube had failed and that the furnace door was open—the result, more or less fatal burns to all in the fire-rooms. We hear of all the failures but the successes are never mentioned. It is not difficult to foresee the failure of a boiler plant designed to furnish 120,000 lbs. of steam per hour but regularly required to furnsih 160,000 lbs. per hour. If nothing else fails, the feed pumps will not do the work, and the tubes will, of course, be burnt out. This would happen with any type of boiler.

You see, I harp on the failures, for I find I can glean the most information from them. Many of the failures have come from the use of boilers that were inaccessible for cleaning and repairs; others from faulty design; others from poor workmanship; others again from neglect. Water-tube boilers require skilled attendance. Other boilers have failed from poor material; others from failure of the feed pumps; but there is not one, so far as I know, that can properly be said to have failed purely as a result of being a water-tube boiler. Failures may come from misusing water-tube boilers, but not from using them. I consider that the experience of the last ten years or more in our own and in foreign Navies justifies me in stating that water-tube boilers when proper precautions are used, can be successfully adopted for the steam generating plant of ocean-going vessels. They are necessities to the best design of war-ships.

I would naturally come now to a discussion of the claims of the adherents and opponents of water-tube boilers. You have all heard these arguments, and it seems almost useless to go over them I shall simply state what I believe to be the advantages and disadvantages of water-tube boilers compared with cylindrical boilers.

Advantages.	*Disadvantages.*
Less weight of water.	Greater danger from failure of tubes.
Quicker steamers.	Better feed arrangements necessary.
Quicker response to change in amount of steam required.	Greater skill required in management.
Greater freedom of expansion.	Units too small.
Higher cruising speed.	Greater grate surface and heating surface required.
More perfect circulation.	Less reserve in form of water in boiler.
Adaptability to high pressures.	Large number of parts.
Smaller steam pipes and fittings.	Tubes difficult of access.
Greater ease of repair.	Large number of joints.
Greater ease of installation.	More danger in priming.
Greater elasticity of design.	
Less danger from explosion.	

A saving in space has been claimed for water-tube boilers, but I do not find this claim sound when account is taken of the increase in grate and heating surface necessary in water-tube boilers to insure satisfactory working, and because of small units the space for accessibility is increased rather than diminished.

The fact that water-tube boilers raise steam quickly is of the greatest advantage. I have stated elsewhere that I consider the battle of Santiago to have developed the necessity of the use of water-tube boilers whether it taught us anything else or not. It would have been of the greatest advantage to have had, during the blockade of Santiago, boilers capable of raising steam in less than half an hour. Coal need not have been used to keep all the boilers under steam all the time. The "Massachusetts" might have shared in the glories of the fight if she had been fitted with water-tube boilers. The "Indiana" would have kept up with the "Oregon" and the "Texas." The "New York" would have developed at least three knots more speed, and the Navy would have been spared a controversy. I think the "Colon" would not have got as far away as she did. But we did not have the water-tube boilers.

The higher pressures possible with water-tube boilers give us smaller and safer steam pipes and better valves. It decreases the size of the fittings and the difficulty of tracing the labyrinth of a ship's piping. It increases the efficiency of the engines. The introduction of compound engines forced us to use cylindrical boilers. In the same way the use of the quadruple-expansion engines necessitates, for economy, the use of water-tube boilers.

But the quick steam raiser is, because of that very fact, not so safe as its predecessor. Of course, nothing on a man-of-war is safe in wartime; but we want things as safe as possible, and the boilers are the keys to the situation in the modern battle-ship. I think that safety in handling water-tube boilers may be assured by using skill in the fire-rooms. I have more than ten years' successful experience with water-tube boilers on which to found this opinion, and I submit that the boilers, placed as they are behind the heaviest armour and below the thick protective deck, are, at the worst, the safest apparatus on a battle-ship. If we can make them work well, we would do wrong to refuse to use water-tube boilers on our ships.

For merchant and for yacht practice it is a different question. I was recently asked what boilers to use on a large steam yacht. I recom-

mended cylindrical boilers. For merchant work the boilers are always in use developing a fixed power. Weight is not there so important as in war-ships, and I think it is at best a moot question whether cylindrical boilers are not still the best that can be fitted to ocean-going merchantmen. In some cases where there are short trips, and the opportunities for repair must be got during the very short lay-ups at the end of the route, the quick steam-raising qualities of water-tube boilers, with their freedom of expansion, enables blowing down the boilers immediately on arrival in port, and still having steam at an hour's notice on all the boilers. Such cases as this seem to me to demand water-tube boilers.

As to the type of boiler to be used, there are as many to choose from as there are fleas on a dog. Some one has said that a certain amount of fleas keep a dog from brooding over being a dog. So the number of varieties we have to choose from may be a good thing for all.

I have always opposed the use of boilers containing screw joints in contact with the fire, and have attempted to secure boilers having no cast metal in the pressure parts. Cast steel is not yet good enough to put between 300 lbs. of steam and our firemen. I believe in straight-tube boilers as being easier of examination and repair than bent-tube boilers. I believe in large tube boilers for the same reason and because the tubes are thicker and have more margin for corrosion. I believe in boilers having as few joints as possible. Water-tube boilers must have freedom of expansion of the various parts, and the simpler the boiler the better. It should not be necessary to introduce reducing valves between the boilers and the engines to secure a steady steam pressure at the latter, nor should it be necessary to have automatic feed arrangements to insure steady water-level in the boilers. To be successful a boiler mus be easy of repair. Lightness is a natural attribute of all water-tube boilers, but it is not wise to go too far in this direction. The ratio of grate surface to fire surface occupied for the complete boiler plant must be as large as possible. The units should be large, the grates short and not too wide. The passage of gases through the tubes should be sufficiently long to insure economy. These gases should be well mixed before entering the spaces between the tubes for the same reason and to prevent smoke. The circulation of the water in the boiler must be free. Tubes should not be too long and the fire-rooms must always be sufficiently wide to provide for free withdrawal.

The foregoing is what we want. We have most of the above *desiderata* in several well-known types of boilers, and ultimately we shall discover the value of each of the foregoing points, and then it will be possible to differentiate between the various types more perfectly than we now can.

In the meantime, all that I can have to say is that the use of water-tube boilers has been definitely decided upon for our naval vessels, because water-tube boilers give tactical advantages of great moment, and because, with care in the selection, manufacture, and management of water-tube boilers, other disadvantages may be neutralised.

THE ACTION OF CAMPO MAYOR, 25TH MARCH, 1811.

[COMMUNICATED.]

PERHAPS no action fought during the Peninsular War occasioned so much discussion in proportion to its importance as that fought between Campo Mayor and Badajos on the 25th March, 1811. For many years a heated and bitter controversy raged between Lord Beresford and General Long, the principal actors in the scene, on the one hand, and General Sir William Napier, the historian of the war, on the other. But the result of this discussion is very little known in these days, in consequence of the accepted accounts of the action having been published previously.

When the French, under Masséna, retired from Santarem early in March, 1811, Beresford was sent in pursuit; but after following them for a considerable time midst the disgraceful scenes of devastation, slaughter, and confusion which marked their disastrous retreat, he was detached by Wellington to relieve Campo Mayor, then being besieged by a portion of Soult's army, under Mortier, and, if possible, invest Badajos before the garrison should have time to repair the defences and prepare for a siege. But Campo Mayor, with its scanty garrison and weak defences, surrendered before Beresford's arrival; and upon his approach, Mortier retired after leaving in it a small force under Latour Maubourg to watch the movement of the Allies.

By the evening of the 24th March, the British force, except Major-General the Hon. J. Lowry Cole's division, which joined on the following morning, had assembled and bivouacked at Monte de Reguengo, between 2 and 3 leagues from Campo Mayor, by which time Beresford learned of the fall of the town. On the following morning, Cole's division having closed up, Beresford, in hopes of surprising the town, put the whole force in motion, unaware of the enemy's intentions, though they knew of his approach, but resolved, should they decide to hold the town, to intercept their retreat to Badajos. His force consisted, in addition to artillery, of two divisions of British infantry, a Portuguese division, five troops of the 13th Light Dragoons, five small squadrons of Portuguese cavalry (1st and 7th Regiments), and a Heavy Brigade, under Colonel the Hon. George Defrey, of eight squadrons of the 3rd Dragoon Guards and 4th Dragoons. The cavalry amounted roughly to 1,200 sabres, under the command of Brigadier-General Robert Ballard Long, and these being ordered forward, soon fell in with the enemy's piquets and drove them in.

The allied cavalry advanced until they came on to a ridge about three-quarters of a mile from, and overlooking, Campo Mayor, from which the French were plainly visible, with the cavalry formed up outside. They consisted of some horse artillery, a battery train of sixteen guns, four regiments of cavalry, and three battalions of the 100th Regiment. Beresford then ordered General Long forward with the light cavalry (13th Light Dragoons and Portuguese), to turn them and gain the rear of the town. But as it was apparent that the enemy was already running from it, and hastily forming in order of march towards Badajos, Beresford, with the idea of overtaking and capturing their infantry, ordered General Long to push on with all the cavalry, turn the enemy's right, and so delay them until the British infantry, or some portion of it, came up; but he was to keep clear of the guns of the town, and, if a favourable opportunity offered, might attack their cavalry, provided he ran no risk of being cut off.

General Long detached one troop of the 13th to engage the enemy's skirmishers on his right, and moved forward with the remainder of the cavalry at a sharp gallop, under cover of, and hidden by, a chain of hills on his right, until he ascended some rising ground, which concealed the French, but in doing this he took a far wider circuit than was intended by Beresford, or indeed was necessary. This brought him on the left flank of the retiring enemy, and for the first time in sight of their whole force, which was moving in good order. It consisted of:—

2nd French Hussars	- - - -	300 sabres
10th French Hussars	- - - -	350 ,,
26th French Heavy Dragoons	- - -	150 ,,
4th Spanish Chasseurs	- - - -	80 ,,

making, after deducting some 80 skirmishers, a total of 8 squadrons, 800 sabres, with a column of infantry over 1,200 strong. The infantry had a squadron of cavalry in front, another in rear, and six squadrons in two divisions *en potence*, covering its retreat.

General Long disposed his force for attack thus:—The two squadrons of the 13th Light Dragoons to charge three of the six French squadrons covering the retreat, while three squadrons of Portuguese, under the General in person, were to cut off the retreat of the other three French squadrons, and to cover the flank of the 13th. The other two Portuguese squadrons, under Colonel Otway, would be on the General's left flank, parallel with the head of the column, to counteract any manœuvre of the enemy in that direction; and the Heavy Brigade, some distance in the rear, to the right, advancing slowly, to watch and support the entire movement as the General directed.

In that formation the British cavalry appeared in the plain opposite the enemy, who halted to receive them. General Long immediately rode up to Colonel Head, commanding the 13th Light Dragoons, and in a few words gave him his orders:—"Colonel Head, there's your enemy. Attack him!" Adding:—"And now, Colonel, the Heavy Brigade are coming up on your rear, and if you have an opportunity, give a good

account of these fellows [meaning the enemy]"; to which the colonel, in his characteristic manner, replied:—"By gad, Sir, I will!"

Directly the French perceived the two columns moving in parallel lines to outflank them, they changed their position to the left, and advanced in three bodies or columns of squadrons—a situation which Colonel Head grasped, and very smartly formed the 13th in line to their front. This practically amounted to the regiment charging the entire French cavalry, a force exceeding them by four to one, for the Portuguese on their wretched ponies, were some distance off to the left, and only just in line with the 13th, while the Heavies were some way in rear.

Colonel Head took his place in front of the regiment, between the two squadrons, Lieutenant and Adjutant Holmes riding immediately behind him. At the same time, the officers detached with the skirmishers rejoined with as many men as were in their reach. The opposing horsemen were now within 200 yards of each other; the right squadron of the 13th, commanded by Lieut.-Colonel Patrick Doherty, being composed of Captain R. Buchanan's and Captain M. Bower's troops, and the left squadron, under command of Lieut.-Colonel Joseph Muter, consisting of Captain J. Gubbin's and Captain Doherty's troops.

Colonel Head led the 13th in a very gallant manner. The regiment increased its pace with the regularity of an ordinary field day, and there was no confusion and no hurry.

The French at a smart trot advanced in a determined style; and when within 80 or 100 yards, Colonel Head, in clear tones, gave the order to charge. The French increased their pace, and both bodies were soon into each other. The scene was said to be inspiriting and beautiful—two forces of cavalry dashing into each other. Many riders and horses were overthrown and stunned by the shock. The number of Frenchmen placed *hors de combat* bore rather ghastly testimony to the superior swordsmanship of the English.[1]

A stout resistance, and the superior speed and strength of the English horses carried them clean through the ranks of the French cavalry. But equally exciting was the succeeding scene in this little drama, for, when a short distance in rear, the 13th wheeled smartly round, and reformed—a movement which, with the better command they maintained over their horses, they performed more quickly than the French, who rode with a loose rein. The French reformed as quickly as they were able, and both forces, for a second time, hurled themselves against each other. The French fought for a time with confidence, while the 13th, somewhat impetuous, but bearing an air of confident superiority, were cutting and thrusting right and left with some execution. The point was the *cheval*

[1] Count Chamarin, Colonel of the 26th French Heavy Dragoons, was engaged in a single combat by Corporal Logan, of the 13th, who was well mounted, a good swordsman, and conspicuous by the dexterity with which he encountered those who came in his way. The French colonel singled him out for attack. The corporal twice cut his opponent across the face; at the following blow the colonel's helmet was knocked off, and, finally, by a cut which nearly cleft the skull asunder, cutting in as deep as the nose through the brain, the career of the brave Frenchman was terminated.

de bataille of the French, but it failed, as the 13th parried with ease. Several instances of individual bravery are recorded, and many hand-to-hand encounters took place, among our wounded being Lieutenant and Adjutant Holmes, Lieutenant Geale, and Quartermaster Garnham.

While these scenes were being enacted, a young French officer of the Grenadier troop, or *Compagnie d'élite*, of the 26th Dragoons, finding that they covered more ground than their assailants, wheeled inwards to the left, and thereby completely surrounded the left of Lieut.-Colonel Patrick Doherty's squadron; but Head's troopers quickly reforming their ranks, again charged, completely routing the French.

Colonel Head saw the favourable opportunity alluded to by General Long, and had every intention of fulfilling his promise to give a good account of his enemy. So without further consideration, but with his men together, in good order, and under perfect control, he led on the regiment after the French cavalry, unaware of the blundering going on in his rear, and trusting—indeed, taking it for granted—that he was being properly supported. Along the road leading to Badajos and up to the very walls of the city, the 13th continued the pursuit, followed closely by two squadrons of Portuguese under Colonel Otway. For some distance hand-to-hand encounters took place, as many a plucky Frenchman fronted his pursuers and sold his life dearly; but the majority made little show of resistance, and on being overtaken threw down their arms and begged for quarter, which was invariably granted by the 13th.

As fast as the tired horses could carry them along, the 13th continued the pursuit, and were so far successful that when they pulled up breathless on the bridge of Badajos, not a score of the enemy's cavalry had succeeded in reaching the town, and the road was strewed with prizes—baggage of every description, stores, provisions, horses, and mules, artillerymen, and sixteen guns, with accompanying wagons, each drawn by eight fine mules. Some of these were in sight of the town, and the drivers, considering themselves safe under the fire of its guns, whipped on their mules, and, refusing to dismount, were cut down.

Here, then, was presented the curious spectacle of some 130 cavalrymen, the remnant of five troops of the 13th, and a few Portuguese, standing unsupported on the bridge of Badajos, quite 10 miles from the original point of attack and almost surrounded by valuable captures. They had succeeded in their attack, had put their opponents to flight, had pursued them for 10 miles, had taken or killed nearly all of them, and captured their artillery and baggage. But where was their support? Not within sight. On the bridge, within range of the batteries of the town, this small group of English and Portuguese officers discussed the situation. They argued that they had nothing to fear, for the column of French infantry, whose fire they had tasted, was the only portion of the enemy's force which they left in rear. Before the charge the Heavy Brigade was close behind to support them, and within easy distance of the French. The allied artillery and infantry must have been on the move and advancing rapidly; and, surely, a comparative handful of French infantry would not be permitted to make good its escape in the face of such an enemy.

But we must see what actually was taking place. General Long, hesitating as to following the 13th, of the result of whose charge he was strangely ignorant, returned to find the Heavy Brigade, in the absence of his orders to the contrary, had not supported the 13th, but were following the French infantry at a prudent distance, and waiting further instructions. The two Portuguese squadrons on the left of the 13th had followed them in the pursuit; and the other three, originally under the General's command, having had a few shots fired into them by the French infantry, and threatened by some of his cavalry, had bolted, but were rallied and brought back. Beresford just then arrived on the scene to find, from the reports of General Long and Baron Trip, by whose unfounded statements he allowed himself to be misled, that the 13th had been cut off and captured. The three squadrons of Portuguese the Marshal saw were in a state of extreme wildness, and fearing to risk the Heavy Brigade, the only steady cavalry left to him, he allowed the French to resume their retreat and escape. The enemy were at one time in the most critical position, and, from all accounts, on the point of surrendering. They were nearly surrounded by the allied cavalry, the German artillery were firing upon them, the Heavy Cavalry within a few yards, and anxious to attack, and the English and Portuguese infantry not 500 yards off, and advancing rapidly. Nevertheless, he ordered the cavalry to halt, and the artillery to cease firing. The French infantry, finding themselves unmolested, gave a shout of joy, and marched off.

To return to the 13th, Colonel Head, after consultation with his officers, decided to retire, collect the captures, and drive them before him until he met his supports. His men had scarcely put about than the batteries of the town opened on them a fire of grape and canister, sufficient to impress upon them the prudence of getting out of range as quickly as possible. They then collected their prisoners and captures, dismounting some of their troopers and putting them on the mules attached to the guns, and in this manner were returning quietly, when they came in sight of the body of French infantry, supported by cavalry—the latter made up partly of the enemy's skirmishers, and partly of men who had surrendered, but who, on seeing their infantry advancing, secured their arms, remounted, and joined in. The position of the 13th and Portuguese was one of extreme danger. In the circumstances, an attack upon the French was out of the question, so they very wisely left the road, made a detour to the right, and rode for headquarters across country, by which means all the captures had to be abandoned; and the Army and the regiment were to reap no benefit from their gallant achievement

With feelings better imagined than described, they wended their weary way back. They met with no opposition, however, and reached the Army between 6 and 7 o'clock in the evening, to the extreme astonishment of their comrades, by whom they had been given up, and more particularly of Beresford, who spied them through his field-glasses, and made little attempt to conceal his annoyance. Colonel Head rode imme-

diately up to the Marshal, but, though a particular friend, was, to his pain and astonishment, coldly and formally received. The Marshal drily enquired whether he thought he had proceeded in a military manner in this mode of pursuing the enemy, and expressed a hope that, for the future, he would recollect that courage was not the only requisite either for troops or officers. And he was currently reported at the time to have concluded with these words:—"And I suppose, Sir, if the gates of Badajos had been open, you would have galloped in!" to which the following very unlikely reply, but at the same time so characteristic of the ardour of the plucky Irish colonel, was said to have been made:—"Indeed, Sir, of that you may feel quite certain." This was followed a few days afterwards by a very severe reprimand from Lord Wellington, which, like Beresford's personal rebuke, was administered under a distinct misapprehension of the circumstances attending the pursuit.[1]

The gallantry with which the 13th Light Dragoons charged the French infantry, the dash exhibited in the pursuit, the rapidity and orderly manner in which it was conducted, and the temporary success which crowned their efforts, were the theme of conversation and admiration in the Peninsular Army for many a day. That the pursuit was conducted beyond prudent limits is possible, but there is ample evidence that, notwithstanding General Long's testimony to the contrary, at no time was there any want of discipline or semblance of disorder; the men were throughout completely in hand, and the pursuit was carried on in orderly regular manner. In fact, the conduct of the 13th throughout the day was worthy of a regiment whose successes earned for it so bright a name on the fields of Waterloo and Balaklava.

General Long does not come well out of the controversy. While praising the regiment to their faces for their behaviour in the action, he appears from Lord Beresford's pamphlets to have reported against them officially in a disparaging and unfair manner. On his report Beresford administered the personal reprimand to Colonel Head on the day of the action, and on that report, coupled with others made by the General through Beresford, Lord Wellington issued his strong admonition; but it is satisfactory to find that General Long's attempts to shield his own conduct at the expense of Lord Beresford and the 13th, were not successful. The Marshal afterwards made ample reparation to the regiment in this respect. "After reading the evidence of Colonel Doyle, Sir Loftus Otway, and Sir Henry Watson, on the pursuit of the 13th Light Dragoons, I am convinced," he writes, "that I was misinformed by General Long

[1]The loss of the allied cavalry was 5 officers, 154 rank and file killed, wounded, and missing; and 163 horses killed and missing, the loss of horses being partly accounted for by the Portuguese abandoning their own for those of the French, and making a return of the loss but not of the gain. The loss of the 13th amounted to 4 officers wounded, 1 N.C. officer, and 55 rank and file, including 2 trumpeters killed, wounded, and missing; and 51 horses killed and missing. The French losses were estimated at nearly 600 killed, wounded, and taken prisoners; a howitzer, a forage cart, and some tumbrils. All the men attached to the French train of artillery were killed, and of 16 officers of the 26th French Heavy Dragoons only 6 remained for duty.

with respect to the disorder and irregularity that was said to have attended it." And Colonel Patrick Doherty, in the letter already referred to, says that Lord Wellington was induced to change his opinions also :— "It is some gratification to hear, which we have done from authority, that his lordship's sentiments have since totally changed, and that he now invariably gives us the credit which we at first expected to receive." General Long appears first to have disobeyed, with insufficient reason, Beresford's order in regard to the wide detour he made which allowed the enemy to get 2 miles on the road before he came up with them. He attacked their cavalry on the left flank instead of in front, as the Marshal intended ; and neglected even then to make proper arrangements for the attack being supported. He appears to have been, indirectly, one of the chief causes of the whole day's misfortunes in misrepresenting the 13th as cut off.

Napier attacked Sir Willian Beresford without mercy. In his reply to the Marshal's strictures on his history of the war, he concluded with these remarks :—"History, my Lord, deals with very great men, and you sink in the comparison. She will speak of you as a General far above mediocrity, as one who has done much and a great deal of it well, yet when she looks at Campo Mayor and Albuera she will not rank you amongst great commanders ; and if she should ever cast her penetrating eye upon this your present publication, she will not class you amongst great writers." This is severe, but surely there is justification for questioning the Marshal's conduct of the operations on this day. He was unfortunate. His plans were partly frustrated by General Long allowing the enemy to go so far before he attacked their cavalry and stayed them ; and the position was rendered worse by General Long attacking them on the flank of their infantry instead of in front and driving them on to their infantry. Not being up with the advance portion of his army, and unable to see the result of the charge, and not taking proper steps to ascertain it, he allowed himself to be misinformed as to the result, and declined to risk his heavy cavalry, remarking that the loss of one regiment was enough. It is an extraordinary thing that he did not bring all the six guns of the German artillery to bear on the French infantry when they were all equally at hand ; and the horses, on fairly good evidence, not tired. Surely the fire of six guns would have been more effective than that of two, and must either have annihilated the enemy at a distance of from 160 to 200 yards, or at all events have obliged them to loosen their formation and afford an opening for the heavy cavalry to act against them with effect. The French were without question in a state of considerable uneasiness bordering on surrender, but he declined to risk his heavy cavalry, and indeed seems altogether to have failed to grasp the favourable situation in which he was suddenly placed. There may be a taint of personality in Napier's severity, but he is nevertheless the most brilliant, the most penetrating, and the most comprehensive of military historians, and his summing up of the proceedings at Campo Mayor is masterly, and worthy of his reputation :—"*To profit from sudden opportunities, a general must be constantly with his advanced*

guard in an offensive movement. When this combat commenced Beresford was with the main body, and Baron Trip, a staff officer, deceived by appearances, informed him that the 13th had been cut off. Hence, the Marshal, anxious to save his cavalry, which he knew could not be reinforced, would not follow up the first blow, truly observing that the loss of one regiment was enough. But the regiment was not lost, and the country being open and plain, the enemy's force and the exact posture of affairs was easy to be discerned. The 13th were reprimanded, perhaps justly, for having pursued so eagerly without orders, yet the unsparing admiration of the whole Army consoled them." He afterwards added:—"In my work I have said that they were perhaps *justly* reprimanded. I now retract that assertion. Having gained fuller information of the conduct of the 13th Dragoons, and of the actual state of affairs, I retract it as unjust; I think they were *unjustly* reprimanded; I think they deserved the greatest praise, and that the '*unsparing admiration* of the whole Army was well founded."

VON LÖBELL'S ANNUAL REPORTS ON CHANGES AND PROGRESS IN MILITARY MATTERS. VOL. XXV. JUBILEE NUMBER. 1874-1898.

(CONCLUDED.)[1]

Précis by Lieut.-Colonel E. GUNTER, late East Lancashire Regiment, of Part II. (Tactical Progress of the Different Arms, etc.)

Artillery Material.—The Report states that in the war of 1870-71 the superiority of breech-loading guns over muzzle-loaders was proved. Want of space forbids our following all the changes since then. But, reviewing the progress of artillery material from 1888 to 1898, Major Schott, who is the Chief Artillery Instructor in the Berlin Cadet School, remarks that in this period, no warlike complications arose, though the political horizon was somewhat clouded. A new revolution in warlike armaments, he said, is pending, which will be of far-reaching significance. Smokeless powder has given the impulse to this.

Quick-Firing Field Guns.—All nations are experimenting with Q.F. field guns. Public trials of these were made by Gruson and Krupp as far back as 1890. At the Exhibitions at Antwerp in 1894 and in Stockholm and Brussels in 1897 certain quick-firers were shown. These guns were discussed in the *Revue d'Artillerie* and the *Rivista di Artiglieria*, and other foreign technical journals. The different systems of Schneider, Canet, Cail, Hotchkiss, Armstrong were mentioned in the von Löbell Reports, only the Vickers-Maxim quick-firer seems to have escaped notice, nor did they give particulars of the excellent Swiss quick-firer 1897, which were published in the *Revue d'Artillerie*. An interesting table was compiled by General von Rohne showing some of the chief characteristics of the Q.F. field guns, from which we extract a few particulars below :—

Manufacture.	Calibre.	Weight of Shell.	Weight of Gun.	Length of Gun.	Weight of Gun Limbered up.	Muzzle Velocity.	No. of Bullets in Shell.	Weight of Bullets.	No. of Rounds in Limber.	Remarks.
	Inches	lb. oz.	cwt. qr.	ft. in.	cwt. qr.	f.s.		oz dr		
Nordenfeldt	2·95	14 4	6 0	6 7	31 3	1640	159	0 7¼	50	*Details not given.
Cail	...	15 11	6 2	7 3	27 2	1722	*	*	36	
Canet (long)	2·95	11 6	6 2	7 10	30 2	1968	*	*	35	
Hotchkiss ...	2·95	15 1	7 0	7 0	31 0	1738	*	*	48	
Creusot ...	2·95	19 1	6 2	8 2	34 2	1837	*	*	36	
Krupp ...	2·95	16 7	7 3	7 0	34 3	1640	250	6	30	
Armstrong ... (Elswick)	3·0	13 11	7 3	7 10	36 1	1970	185	7	36	

[1] See JOURNAL, October, 1899, p. 1087, for Part I.; and December, 1899, p. 1330, for commencement of Part II.

Field Howitzers.—Creusot, Krupp, Canet, and Armstrong have also produced field howitzers, mostly of 4·7-inch calibre (12 centimetres). The chief conditions required were :—1. A range of 5,000 metres. 2. A curved trajectory for searching fire-effect combined with accuracy. 3. Weight of gun and carriage not greatly in excess of those of ordinary field guns. 4. Easy supply of sufficient ammunition. On the whole the 12-centimetre calibre answered the conditions best. With it a range of 5,600 metres was obtained. A smaller calibre did not give sufficient fire-effect. A calibre of 15 centimetres (5·9 inches) brought about difficulties in the transport of ammunition, necessitating double the number of ammunition wagons. So on the whole the latter was considered better adapted for defensive works of a more or less permanent character when the question of ammunition supply is less difficult (the shell weighs 101 lbs). The Schneider-Creusot 4·7-inch field howitzer is about 5 feet long. The shell weighs 44 lbs. and has a muzzle velocity of 1,181 f.s. It takes about 3 or 4 minutes to fire a salvo of 10 rounds. The weight of gun and limber with 20 rounds of ammunition is about 47¼ cwt. It has a hydraulic buffer.

The 4·7-inch Armstrong field howitzer is 5 feet 2 inches long, carries a 45-lb. shell with a muzzle velocity of 1,181 f.s. It has a hydraulic buffer and a recoil spade under the axle.

Mountain Artillery.—Most countries assimilate their mountain guns to their field artillery. They must not weigh more than 3 cwt. They mus be adapted to wheel or pack carriage. The battery is the unit, brigade divisions not being applicable, as, in the case of a sudden onslaught by wild savages, great confusion and destruction of material might ensue.

Latterly Q.F. mountain guns have been introduced. The projectiles in use are common and shrapnel shell and case shot. The Russians use a Baronowski, with a calibre of 2½ inches (6·35 centimetres). It is effective with common to about 5,500 yards; shrapnel to 2,800 yards. Mountain horse artillery have limbers which can be carried on mules. The Spanish mountain batteries use a 7·88-centimetre (3·18-inch) gun of the Plaunin system. They used in the late war a few Krupp Q.F. machine guns. Each weighs about 2 cwt., with carriage, total about 7 cwt., which is carried on four mules. Range, with common shell, nearly 4,300 yards; with shrapnel 3,900.

Armstrong has constructed a screw gun, a 3¼-inch howitzer, weighing only about 1⅛ cwt., for use with mountain batteries. In Africa : Germany has 2·7-inch Italian and 2·6-inch German mountain guns, besides 2-inch and 1·5-inch Q.F. field guns. Several Maxim guns are in use by her colonial troops.

IV.—Siege and Fortress Guns.

Space forbids more than a brief notice of the most recent siege and fortress guns.

Germany.—In 1898 there were three principal guns—the 15-centimetre (5·9-inch) howitzer, the 21-centimetre (8·2-inch) field mortar,

and the heavy 9-centimetre (3·5-inch) guns. The 15-centimetre howitzer is the heaviest gun of position with a field army. The common shell weighs 88 lbs. It is fired either from a fixed platform or from a travelling carriage; on the move, it weighs about 52 cwt., and is drawn by six horses. The 8·2-inch mortar also moves on a travelling carriage. It fires common shell of 173 lbs. weight. The 9-centimetre gun fires shell of about 15 lbs. weight, shrapnel of about 16½ lbs., and case shot.

France.—The French siege artillery is on the de Bange system. The Lavitolle gun of 9·5 centimetres (3·8 inches) weighs about 12½ cwt. It fires common shell of about 24 lbs. weight, shrapnel of about 27 lbs., and high explosives.

Of the chief mortars, the light weighs about 2 tons; the heavy 5½ tons. A mortar of about 17 centimetres (6·5 inches) is being constructed. The 15·5-centimetre (6·7-inch) shrapnel carries 416 hardened lead balls. These guns were horsed and dragged about at the French manœuvres of 1895. They have also guns on the Hotchkiss system, Raffye Q.F. guns (15-pounders), and some mitrailleuses.

The Russians have in their siege artillery 20·32-centimetre (8-inch) howitzers and field mortars, carrying common shell weighing 180 lbs.; a 22·86-centimetre (9-inch) mortar, carrying a 270-lb. shell, for use against earthworks, firing high explosives and common shell; and for the defence of their trenches they have a 5·7-centimetre (2·23-inch) Q.F. gun, carrying a common shell of 6·6 lbs. weight, and case weighing 10½ lbs. They have lately added Maxim machine guns, carrying Russian rifle ammunition, and are adding special 8-inch siege guns to fire high explosives.

The guns, etc., are mostly of steel.[1]

Great Britain.—The siege train guns are still muzzle-loaders. 5·4-inch guns and 6-inch howitzers are being introduced provisionally. Their calibre answers to 13·7 and 15·2 centimetres respectively. They fire common shell of 60 lbs. and 118 lbs.

The coast batteries in Great Britain are armed with heavy breech-loading guns, ranging from a 4-inch (22-pounder) to a 16¼-inch, firing a shell weighing 16 cwt.

Several coast batteries are armed with mortars for firing on the decks of ships, and there is a tendency to provide Q.F. guns also, so as to bring the batteries on an equality with the ships.

Looking back on the wars of the current century, the civil war in Chili in 1891 only added to our experience in torpedo warfare, and in the use of Q.F. guns of small calibre. The Madagascar and Abyssinian campaigns yielded no results as regards artillery. The Græco-Turkish War of 1897 was so rapidly terminated that no opportunity was offered to test the Turkish field howitzers.

[1] Space forbids describing the numerous Russian guns; but, as after Plevna they spent a great deal of money in getting heavy guns, the matter is worth the attention of our military authorities.—TRANSLATOR.

The Editor gives a formidable list of foreign works on artillery, which deal with the development of modern artillery. Many of these, by Langlois, Rohne, Wille, Schott, etc., are well known to our officers. In addition to the military periodicals especially devoted to artillery, the *Kriegstechnische Zeitschrift*, which appeared on the 1st January, 1898, gives information on the subject. The Berlin *Militär-Zeitung* had several articles in it by von Siegert and Rohne. The *Revue Militaire Suisse* and the *Revue de l'Armée Belge* contain much technical information.

Small Arms.—*Magazine Rifles.*—The Report goes briefly into the history of the evolution of breech-loading rifles during the last twenty years in the following countries: Germany, France, Russia, Austria, Italy, Great Britain, Sweden, Norway, Switzerland, Turkey, Holland, Belgium, Denmark, Greece, Spain, Portugal, Roumania, Bulgaria, and the United States.

This is preceded by a few general remarks tracing the general progress of breech-loading rifles, etc. They are of interest, but space does not admit of their reproduction.

The Report gives some new comparative tables of magazine rifles, concerning which all the chief details are given. We do not give these, because tables of modern military rifles and carbines, compiled by the Intelligence Division, War Office, were published in the Military Notes of this JOURNAL for August, 1899 (pp. 919-920), and the von Löbell tables do not differ materially from these; but the latter give some useful details not included in the former, such as muzzle velocity, weight of bullet, cartridge, etc. The muzzle velocity of the Spanish Mauser, which the Boers are chiefly armed with, is given as 2,378 f.s., whereas the Lee-Metford is stated to be 2,000 f.s. only.[1] That of the United States Navy rifle is said to be 2,525 f.s., the German Mauser 88 millimetres = 2,083 f.s., and the Dutch Mannlicher and Roumanian 2,395 f.s.; but these three latter are of ·236-inch and ·256-inch calibre only. The report ascribes to the gradual waning of British influence and to the ascendency of Germany the adoption by the Turks of the Mauser magazine rifle, which is, however, of the M/90 or Belgian pattern, ·315-inch calibre; but the bullet has greater muzzle velocity (owing to a lighter bullet and a more powerful smokeless powder being used).

The Report says that speaking generally the "Mannlicher" system is on the whole inferior to the best models of the latest "Mauser" construction; but some rifles, such as the Mannlicher M/93, in use in Holland, is equal to any ballistically.

It speaks of the British weapon as inferior as a magazine rifle because it has only its one magazine to depend on, whereas the Mauser and Mannlicher rifles can multiply theirs by means of frames or "clips" rapidly adjusted.[2]

[1] The Musketry Instruction gives it as 2,200.—TRANSLATOR.

[2] This defect of the British rifle has been frequently drawn attention to by Captain W. H. James (late R.E.), in his lectures on "Magazine Rifles" published in this JOURNAL.—TRANSLATOR.

The Report thinks it extremely probable that the re-armament of the French Army with a new rifle, which has so constantly been reported, will take place in the near future, as its weapon, the Lebel, is on account of its faulty construction inferior to that used by the other Great Powers.

The general tendency of the improvement in small-arms is shown briefly as follows, in the period from 1873 to 1899 :—

The weight of the rifle has been reduced from about 9½ to 8½ lbs. The calibre of the rifle has been reduced from about 45 to 25 inches. The calibre of the bullet has been reduced from about 385 to 154 grains. The muzzle velocity is increased 1,143 to 2,330 f.s. The single-loader has developed into a magazine or automatic repeating rifle.

The Evolution of the Military Cycle.

It is not generally known that the experiments with bicycles were made as far back as 1650. But we have only authentic records of the wheel from the beginning of the fifties in the nineteenth century, when a velocipede made in Schweinfurt by Fischer was taken to America and there christened "the bone-shaker"; solid rubber tyres were then added. In 1867, the officers of the Court of Napoleon III., took it up as an amusement, but it was the practical Englishman who first grasped the immense future before it. In 1884, Stanley constructed the low-wheeled 30-inch "safety" bicycle with a chain and front steering-wheel. In 1889, the hollow pneumatic tyre of Dunlop was invented. This tyre which was 2 inches thick (inclusive of outer cover) has, combined with the lightening of all the component parts by means of hollow tubes and the perfecting of machinery converted the bicycle from a toy into a conveyance that has accomplished the tour of the world.

Improvements were continually made with a view to the combination of lightness and great rapidity with sufficient strength and endurance. Then the attention of the military world was directed to it. In England Lord Wolseley, Colonels Savile, Strachey, Major Scobie, and Lieutenant Balfour, were the first to take it up. In France General Gallifet, Colonel Denfert, Captain Gérard, and others. In Germany Count Waldersee, Baron von Puttkamer, Lieutenant Stadelmann, etc. In Italy and Austria-Hungary it also had its votaries. France took the lead, and in 1894 a few were used at the manœuvres. In 1895 permanent regulations for the employment of cyclists were issued. At the manœuvres of 1895, two cyclist detachments under Captain Gérard and Lieutenant Saumade were formed, Captain Gérard making use of his well-known folding cycles which covered 2,000 kilometres (about 1,250 miles) and were folded up and carried over 300 times. At the manœuvres of 1897 two companies each of 150 men were formed; these were especially used in the cavalry manœuvres. Captain Gérard, who commanded one of them, wrote a detailed account of their performances in Nos. 152-153 of the *Revue de Cavalerie*, 1897. He claims that the cyclist company can accompany the cavalry anywhere, and can support them with their fire, so that the defensive power of independent cavalry divisions is assured. General Lewal thinks, however, that they cannot take the place of mounted infantry.

Russia.—A cyclist section divided into half-sections, each sub-divided into two groups, was tried at the manœuvres at Bialystock in 1897. The result was satisfactory, as, though the speed attained did not greatly exceed that of infantry, they could go wherever the latter could.

Italy.—Italy was foremost in the adoption of cyclists. In 1892 Lieut.-Colonel Massaglia proposed to attach cyclist companies 200 strong to the cavalry divisions.

A permanent organisation of a Bersaglieri cyclist company, 60 strong in peace, 120 in war, is to be formed from the Bersaglieri Infantry Regiment (which has 12 companies). They are to go through a course of three months' training in the Pavona War School. Captain Boselli has designed a folding cycle, which gave good results.

Austria has as yet only used cyclists as messengers. They were thus employed in the 1897 manœuvres.

Germany.—The *Felddienst Ordnung* of 1894 recommends the employment of cyclists as messengers in place of mounted orderlies, and in keeping up communication on the line of march between the various bodies. In 1895 provisional regulations for cyclists were issued. The cyclists were armed with revolvers. The valises of the men are carried in wagons, but each man has a cycle bag slung on the machine, which contains a change of clothing and a reserve ration. In the estimates for 1899 an expenditure of 253,992 marks (about £12,509) for bicycles will be included.

In 1894-1895-1896, cyclists were tried at the manœuvres of the 9th Corps (Count Waldersee).

At the Imperial Manœuvres in 1897 detachments of cyclists from 60 to 100 strong were tried, and altogether about 1,000 cyclists were employed.

They were chiefly used with the cavalry divisions and with advanced guards. The ground covered averaged about 80 to 100 kilometres (50 to 62 miles) a day for six or seven consecutive days. The cyclists were not only used as messengers, but for reconnaissance and patrolling (either independently or attached to the cavalry) for the seizure and occupation of advanced positions, bridges, fords, and other points of passage, and as escorts for artillery and train. As messengers they much excelled the cavalry, and the enemy suffered much owing to their activity. Even on the worst roads they managed to get along. Only continued rain obliged them to confine themselves to the roads. In fine dry weather they sped over the stubble fields. On the 7th September a cyclist detachment, opportunely arriving, took part in the fire fight of the opposing cavalry divisions. Luckily the detachments had been carefully trained some time before the manœuvres, and a careful process of weeding had been gone through at the hands of their well-skilled leaders. This points to the necessity of a permanent organisation, or, at all events, to the formation in peace of cadres, which in war-time could be expanded. The more solid the organisation of all such bodies in peace the greater will be their tactical success in war.

Military literature busied itself with the question, and in 1895 Lieutenants Gerhard and Puttkamer wrote "The Military Cycle," and in 1896 "A School for Cyclists." In 1896 Captain Stavenhagen published "Military Methods of Observation and Communication." This writer advocated a folding chainless bicycle of moderate weight, not too high above the ground, so that the rider could put his feet down without getting off the saddle. He recommended the formation for fighting purposes of cyclist companies of 4 officers, 12 non-commissioned officers, a chief artificer and 4 assistants, 3 buglers, and 200 men. One such company should be included in each army corps and each cavalry division. Companies should also be attached to technical troops in proportion to their strength. These companies were to be divisible into four sections, each of which would be furnished with two twin steel cycles for the conveyance of tools and small stores. A general reserve of cycles would be carried in a company wagon. The men would be armed with the infantry short rifle and carry 165 rounds. Colonel Keim spoke favourably in the von Löbell Reports of 1896-1897 of cycle companies, advocating the formation in peace of permanent establishments. He said that they could not fail to influence favourably minor operations, and would conduce to the independence of cavalry and artillery. Captain Burckart sees a great future for cyclist companies of 200 to 250 men strong in minor tactics. He thinks they would enhance the importance of cavalry, inasmuch as they would relieve that arm of many harassing duties which break up its efficiency and thereby enable it to be preserved intact for the battle-field. He condemns the folding cycle. General von Boguslawski in his small but interesting *brochure* "The Cycle in Civil and Military Life, 1898," does not on the whole think much of the bicycle, still less of the folding cycle, which would make the man a heavy and, for actual battle, almost useless infantry soldier. He does not consider it will play any considerable part in war, and it will only be a passing phantom. He thinks it might be of use in partisan warfare, where there is a want of cavalry, and would find employment in fortress warfare for communication. So ideas differ. Colonel Keim and von Boguslawski are opposed on the question. The writer is on the side of the former, who favours a folding cycle. The majority of German officers, however, are for the stiff frame.

Military cyclism is in its infancy. It is in a way a new arm, which requires independent organisation—special tactics, special methods. For this specially trained leaders and men are needed, but trained on a uniform system. The most careful peace organisation and practice are necessary. The arm cannot be improvised in war so as to fulfil the demands on it. More special qualifications are required in a military cyclist than in an ordinary cavalry or infantry soldier. He must be a selected soldier with special technical and tactical training, which want of time and means of interest prevent the already over-burdened ordinary infantry and cavalry soldier from acquiring. Special corps are objectionable if they are to be deducted from the war strengths of the units, still in the long run they become indispensable. Therefore the most

searching unprejudiced inquiries and aids are required to discover the most suitable machine. Whether a stiff framed cycle with a frame, or—as the writer believes—a chainless folding cycle, is to be the military cycle of the future, it is certain that it must have great solidity, firmness, and simplicity in all parts, a suitable weight, no bright iron work, etc., and be of the best make that our *home* manufacturers can produce with *home-made* materials.[1]

Military Balloons.

In 1798, after Napoleon Buonaparte had disbanded the captive balloon section which had been used by the French in the war in Belgium four years previously, it fell more and more into oblivion.

In a few isolated cases balloons were used at sieges and also in other operations of war for reconnaissance, but these did not lead to any permanent organisation of this branch of the Service.

It was not really until the successful application of the balloons to military purposes by the French during the siege of Paris, 1871, and their further efforts in 1874 with a navigable balloon were partially successful that the attention of the Great Powers was again directed to the question of military balloons.

Germany and England worked out their own experiments in this service independently, but most of the other States imitated with more or less skill the French, and procured their material from French factories.

In this way three different types of war-balloons and their equipage arose, which are even to-day distinguishable. Common to all is the English method of filling the balloon with liquid gas, which is carried on the march highly compressed in steel cylinders.[2]

Balloons[3] were employed in the Bechuanaland expedition in 1884.

On the other hand, balloons differ much in size, form, and material, and the balloon transport in size, construction, and mobility.

The French balloon train is fitted out with many glass retorts. Its wagons are, however, heavy and not adapted to the field owing to their comprising a steam engine. The varnished silk balloon, which contains about 500 cubic metres (17,640 cubic feet), is light, well made, and perfect to the smallest detail.

[1] The writer has apparently never heard of Major Baden-Powell's "Tripartite," or other English military cycles. He mentions Captain Gérard's pamphlet, "Infanterie cycliste en campagne, 1898," and some other less modern publications. It will be noticed that the information given is not quite up to date, as was to be expected, since it is only recently that the question has been taken up in Germany. —Translator.

[2] It is on record that balloons were employed by the French under Dumouriez at the battle of Fleurus in 1774.

[3] The car and balloon with rope packs into $3\frac{1}{2}' \times 2\frac{1}{2}' \times 2\frac{1}{2}'$ and weighs about $3\frac{1}{4}$ cwt. The weight of a gas tube is 72 lbs., it contains 120 cubic feet of hydrogen, 35 tubes are carried in each wagon, which, loaded, weighs about 43 cwt., carrying compressed gas; thus it only takes 20 minutes to fill the balloon. It has also a higher lifting power.

It is necessary to have a large supply of loaded tubes at the base of operations. There are many obvious objections to making the gas on the spot; delay, danger of carrying sulphuric acid, etc., but it can be done.

The English balloon train consisting of but few wagons is very mobile and simple. The balloon made of fine animal intestines is scarcely half the size of those of other States. This mobility and simplicity, however, somewhat impair the efficiency of the balloons.

The German war-balloon train is very strong, but still mobile enough, thus fulfilling the chief requirements of all military carriages. The balloon is made of cotton thinly coated with india-rubber in globular shape, and also in the form of kites. It is heavy and not so elegant as the French, but is superior in utility and efficiency, especially in bad weather.

The balloons of other nations and their trains partake more or less of one or the other of the above-described types. The war experiences of modern war balloons having been gained in minor expeditions (the French in Tonkin, the English in the Soudan, the Italians in Abyssinia) we are obliged to draw our conclusions from experiments at peace manœuvres, which alone can be looked upon as suitable for the purposes of European war. Peace manœuvres are, however, inconclusive, because unavoidable conditions arise which would not hold good in war. First, there are but few consecutive days, and on these but few hours when the balloon can work. Many commanders of rank are altogether against the use of war balloons. They say it always betrays at once your own position. This, however, would be known in any case if armies are within a day's march of one another by cavalry reconnaissance, and it only shows the position of the balloon, not that of the troops, nor their strength, and in any case it is not to be compared with the advantage of your being able from a balloon to see the enemy's position and estimate his numbers.

It is said to be too dependent on wind and weather, that its services can never be reckoned on with certainty. In Germany the "kite-balloon" has been constructed, which can resist a wind of the force of about 16 metres a second (50 feet a second).

No technical appliance of modern times (steam, electricity, etc.) acts with certainty at all times, under all conditions, yet one does not therefore cease to use it. Perhaps the range of view from balloons has been over-estimated. It is necessary to ascend 1,000 metres (about 3,300 feet). Only in very clear weather can objects be reconnoitred at a distance of 8 to 10 kilometres (5 to 6 miles). As regards danger from shrapnel, it has to be about 3 miles distance from field guns and about 4 miles off siege guns to be safe. The efforts to overcome the difficulty of steering war balloons are making progress, but the problem is not yet solved. The German Balloon Train has all the mobility of a field battery, the wagons being on the limber system.

The French have field-balloon and fortress-balloon sections, the latter at Belfort, Epinal, Toul, Verdun. The *matériel* of the sections is interchangeable. Each balloon detachment is divided into 4 lines of transport. The first line has 1 carriage for gear, including 3 balloons, 1 steam cylinder with gas-metre cable, 5 tube wagons, 1 supply; the second line 4 gas-tube wagons; the third line 5 tube wagons; the fourth

line, 1 for gasometer, 1 for compressing apparatus, 6 gas wagons. Each tube-wagon contains 8 tubes, each holding about 12,200 feet of gas.

The attachment of the car is ingenious, giving this the utmost possible steadiness in a high wind. A small satellite balloon for one observer accompanies each pair of balloons of the normal size. The English organisation is much praised on account of its practical character, portability, etc., for the tubes can be carried on mules or camels, and it is adaptable to every country.[1]

Russia organised its war balloon establishment in 1890. Its equipment is heavy owing to its system of making gas in the place where the balloon is to be used, which takes many hours. Each detachment carries a balloon.

The United States used war balloons in 1863, but in the long peace they fell into disuse. In 1892 a balloon train was organised with portable compressed gas. The balloon was larger than the English one. In the late war with Spain, however, their organisation was apparently incomplete, for they had to buy foreign war balloons and enlist their detachments.

The Pigeon Post Service.

The use made of pigeons by the invested force under Sir George White at Ladysmith for communications with Pietermaritzburg, and the attention, after years of delay, being now bestowed upon the subject in the British Royal Navy, would have made the report on "The Messenger Pigeon Services of Europe" of particular interest. It is, however, meagre and unsatisfactory. Perhaps it is difficult to get information from the different States as to their depôts, methods of training, etc. It is not every nation which, like Great Britain, is so good-natured as to allow thousands of "homing" pigeons to be brought to our shores from Germany, and to see practically how long they take getting home with despatches, and what proportion of them arrives.

The writer enjoins the careful training of the "homers," and warns against the practice of expecting exaggerated performances as regards distances, etc. This is the result of training for prize-winning only, as civilians do. For military purposes, reasonably distant flights only should be expected, but the birds should be always ready to accomplish these after being some time in confinement. The question of being constantly kept well nourished, but never over-fed, is not sufficiently attended to.

[1] The details of the British equipment being well known to English officers, I have not given them. England made use of war balloons in Bechuanaland and in the Soudan in 1884. The war balloons of the British service are of much use n South Africa. A balloon ascended a great height above Potgieter's Drift on the 20th January, and signalled the positions of the Boers' entrenchments to the artillery, who successfully shelled them.

The discovery from the balloon of the formidable battery of heavy guns quickly brought into position to oppose the advance up the defile from Monger Drift of Sir R. Buller's force was of the greatest importance.—TRANSLATOR.

Attempts have recently been made to train pigeons to fly backwards and forwards between stations; also to make them fly back to their wagon with the train of an army on the move, being taken out therefrom, and sent forward two days' march ahead with the advanced column. All such endeavours have so far failed.

The use of pigeons at sea has been, on the whole, successful. Occasionally, however, the birds have flown to the nearest land instead of home, which might lie in the opposite direction. It must be borne in mind that, while gifted by Nature with certain extraordinary powers and instincts, the bird cannot reason as his trainer reasons. The latter should, therefore, expect no greater performances from his bird than its natural instincts lead to and its strength enables it to carry out. Length of flight, power of vision, training in "homing" must all be regulated accordingly, and, though in this manner good results reward the efforts made, certainty of success cannot always be relied on. One of the chief points to be attended to in the training of "homers" is to let them lead as natural a life as possible.

Military Telegraphy and Signalling, 1874—1878.

1858.—As far back as 1858, in the Indian Mutiny, the British had established a regular system of field telegraphy apart from the regular telegraph system of the country. They also used it in Abyssinia in 1868. The many wars carried on by Great Britain in countries beyond the confines of Europe had two other important results:—First, in the establishment of a permanent corps of military telegraphists; secondly, in the establishment and perfection of visual signalling. Favoured by the bright atmosphere and dry climate of tropical countries, this had proved wonderfully successful, especially when the heliograph was brought into use. England, however, failed to organise this service on a proper, uniform system, which, notwithstanding the excellence of the *personnel*, led to many a failure with its field telegraph.

In the Ashantee War in 1873, the poles were too heavy. In Egypt in 1882 the organisation was defective, so that neither *matériel* nor *personnel* was ready for use in sufficient time for the purposes of the campaign. In the American War of Secession the electric telegraph was freely used on both sides, but, after the termination of the war, little progress was made then.

The Franco-German War gave great impulse to the field telegraph service in all European States.

In the German service the construction of the organisation was generally acknowledged to be correct, and was as generally adopted. The State telegraphs of a country constitute the first zone. The lines of communication (*etappen*), lines connecting the above with the headquarters of the armies in the field form the second zone. The third zone is the actual field telegraph, which connects the army headquarters with

[1] This might be awkward in case of war; but, of course, the precaution of having the messages written in cypher would be taken.—TRANSLATOR.

the commanders of the chief field units—the army corps. The difference between the latter and the wires of the second zone lies in the character of the wire used. The latter is permanent and may be heavy. The former must be portable so that it can be taken up and used over again. It must be light, and at the same time strong enough to stand the wear of being constantly set up and taken down. So continued efforts must be made to perfect the materials to these ends. The fourth zone, the *light* field telegraph, was not in the first place made use of. It met with much opposition, yet it was the adoption of this that really influenced the development of the field telegraph. The higher leaders depend upon it to maintain communication with their subordinate bodies and with the advanced cavalry. The latter must therefore be constructed with this service. For this purpose the material must be of more than ordinary lightness, it must not require wagons for its transport, but must be capable of being carried by cavalrymen.[1]

Where visual signalling can be used for the fourth and even for the third zone it is of advantage. Still it is only a subsidiary means. The electric telegraph constitutes the chief framework of the system, the most reliable method, visual signalling being dependent on clear weather and (with lanterns) dark nights for its success. As a rule, therefore, the electric telegraph is used in all armies for the network of regular communications from the front and with permanent stations, etc. Only in Abyssinia in the eighties do we find permanent stations for visual signalling established, as the inhabitants always destroy the electric telegraph. This was also done by the Spaniards in the Cuban insurrection from 1895 to 1897.

Among the latest improvements in electric telegraphy was one made in 1882 by the English Captain Cardew, who brought out the "Vibrating Sounder"; and another, in 1890, the Austrian Cavalry Patrol Apparatus, a microphone, vibrator, and telephone, in a case which can be easily carried by a mounted man. Quite a thin wire is used, 550 yards weighing less than 12 ozs. This the rider runs along the ground. The German patrol apparatus was an improvement on this, and in this way can the electric telegraph be carried forward into the fourth zone without being burdened with wheeled carriage. Civilian operators must of course be replaced by military men, and the latter must be highly trained.

Visual Signalling,

which we will call optical, was used long before 1870—flags, torches, and lamps having been used. In 1871 the heliograph was used during the Commune Revolution, communication having by this means been established between Mont Valérien and Verseilles. Telegraph schools were established in Germany in 1886, Russia in 1887, France and Sweden in 1888, Austria in 1889. Spain and Italy had established a regular telegraph service in 1883. The first-named

[1] The amusing account of Lord Kitchener making the donkeys "pay out" the air-line cable in the Soudan War will occur to the reader.—Translator.

consisted of a new organised battalion of 4 companies, 3 electric telegraph and 1 optical company. In 1888 Russia followed suit with a new organisation of 17 telegraph detachments. In 1892 Austria formed a telegraph regiment, and two years later added to each of its engineer detachments a telegraph company. So France and Germany alone of all the Great Powers remained without a permanent telegraph organisation. At length, in 1896, the first commencement was made in Germany, where the 5th Company of the Pioneer Battalion of the Guards was attached to the School of Telegraphy as provisional telegraph company. In 1897 France formed a field telegraph battalion of 6 companies and brought the whole telegraph system under the Corps of Engineers.

Excepting in Great Britain and some of the smaller States, only Italy (which has 12 telegraph companies) and Russia fulfil the requirements of a good telegraphic service, as they can attach 1 telegraph company to each army corps. Austria, for instance, has only an establishment of 18 officers and 362 non-commissioned officers and men, whereas in war they would require 53 officers and 1,994 non-commissioned officers and men. The number of reservists, etc., to be called up would therefore be about 82 per cent., and there would be no time to train and practise them. Austria and Germany also must largely increase their establishments of telegraphists. It is easy to provide for the employment of the many trained signallers by imitating the English system, by which trained signallers of the Royal Engineers are exchanged from time to time with those of the Postal Telegraph Department.

It will be noticed from the above very imperfect report that the British Army is probably well abreast of foreign Armies as regards the telegraph and signalling service. The writer is apparently unaware of the great progress of the British Army in visual signalling both as regards organisation and performances. The writer may not have gone into the question of the telephone, which belongs to this section, or his information about it may have been meagre; but, whether they have a permanent organisation or not, the French telegraphic and telephonic arrangements are much more complete than would be gathered from the above whenever they take the field at manœuvres, etc. They attach trained telegraphists to each cavalry regiment. In Germany the field telephone is not used so much as the telegraph. In Belgium a combination of both is used, the apparatus being a very light one.

The Boers in South Africa use the telegraph and flag and flash signalling. We may shortly expect from thence some reliable reports as to the working of Marconi's wireless telegraphy.—TRANSLATOR.

COMMISSIONS FROM THE BRITISH RANKS, 1706—1855.

By CHARLES DALTON, Esq.

(*Editor of English Army Lists and Commission Registers, 1661—1714.*)

A GENUINE ranker has been defined as "the man of respectable parentage, good education and character, who becomes a soldier with the object of making the Army a profession, and joins without money or scrip, without influential or sympathetic friends."[1] From time immemorial British soldiers of the above type have been promoted from the ranks to combatant commissions, and their names have, in many cases, added lustre to the Service which they were so well fitted to adorn.

A unique and little known MS. at the War Office throws a flood of light on the services of non-commissioned officers and men in Marlborough's Army who received commissions in 1706. The MS. in question is a small vellum-backed folio, entitled "Recommendations for Commissions in the New Levies, 1706." It contains contemporary copies of hundreds of applications for commissions, and petitions for promotion, by officers who had served, by persons who wished to serve, and by non-commissioned officers and soldiers asking for advancement. The *raison d'être* of this military register is quite clear. The heavy British losses in Flanders, Germany, Spain, and Portugal, during the first four years of the War of the Spanish Succession, necessitated a large increase to the Army in the spring of 1706. It was highly important that the new regiments should be largely officered by gentlemen who had previously served in the Army. To attain this end, officers and deserving non-commissioned officers and soldiers were invited by the Commander-in-Chief to send in their applications for commissions in the new levies; each application to be accompanied, in the case of those who had served, by a recommendation from at least one officer of high rank who was personally acquainted with the applicant; while in the case of persons who had not previously served in the Army, a recommendation was required from a Member of Parliament, or any nobleman or gentleman of assured position. To facilitate matters, the numerous applications for commissions, and petitions for advancement, which inundated Marlborough's office in Whitehall, early in 1706, were copied into the aforesaid military entry book, and systematically arranged as follows:—The left-hand margin contained the name and

[1] *Army and Navy Gazette*, 29th April, 1899.

rank of applicant; the right-hand margin was reserved for the name and status of those who certified in favour of the petitioner; while the centre of the page contained a *précis* of the petition itself.

As a record of military service, this old MS. volume is highly interesting; but it is something more: it is a valuable relic of Marlborough, for the great captain has himself initialled the names of the officers and persons whom he thought fit to recommend to Queen Anne for commissions in 1706, prior to his departure for Flanders.[1]

Space only permits one-third of the list of non-commissioned officers and privates, whom Marlborough commissioned in 1706, being enumerated here with their respective claims for advancement.

"*Walter Eustace*

"Carried arms in the first regiment of Foot Guards the space of two years, at which time there being a battalion ordered for Spain he voluntarily offered his service, and continued at Gibraltar till he was wounded. Prays a lieutenancy in the new levies. Recommended by Col. C. Etherege."

"*Robert Gordon*

"Has been in the Service twenty-three years, and eleven of them a sergeant in Lt.-General Erle's regiment. He was taken prisoner at Stienkirk under Brigadier Cadogan, and is now a private gentleman in the (Horse) Grenadier Guards. Prays a lieutenancy in the new levies. Recommended by Lt.-General Erle."

"*William Allen*

"Has served her Majesty in the Office of Ordnance all this war. In the year 1703 he went bombardier to the Straits under Sir Cloudesley Shovel, and has served in the Train of Artillery in Holland the two last years, and was present at the battles of Schellenberg and Blenheim, and marched under his Grace's command to Trier. Prays a lieutenancy in the new levies. Recommended by the Speaker."

"*Christopher Aldridge,*

"A dragoon in Major-General Ross's regiment. Took Count Horn at forcing the French lines, and delivered him to his Grace. Being informed by the said Count that his Grace was pleased to say that he would provide for him, he therefore humbly prays a lieutenancy in the new levies. Recommended by Count Horn."

"*Richard Bostock*

"Has served in Brigadier Howe's regiment upwards of twenty years, and sixteen thereof as sergeant. Prays to be a lieutenant in the new levies. Recommended by Lt.-Colonel Armstrong."

[1] On the last page of the MS. book, described above, is the following notice: "My Lord Duke of Marlborough desires commissions may be presented to Her Majesty according to the foregoing lists, and that when they are signed they may not be delivered out but upon the respective officers appearing in town with their colonel's certificate to receive them.—A. Cardonnel. Whitehall, 27th March, 1706."

"*Samuel Kempster*

"Served as trooper in Brigadier Villiers's regiment all the wars of Ireland, and afterwards as a corporal in the same troop in Flanders till the conclusion of the Peace, at which time he was reduced at his desire; but some time after he listed himself in Lt.-General Wyndham's regiment, under Captain Strickland, who promised to advance him, but he is since dead. Prays a lieutenancy in the new levies. Recommended by Col. Carpenter, Mr. Neville, Col. Stanwix, and Brigadier Palmes."

"*Corporal Sandford,*[1]

"Of General Lumley's regiment, who was taken up as dead with nine wounds at the battle of Blenheim. Prays a lieutenancy in the new levies. Recommended by Col. Crowther."

"*John Pendergrass*

"Was a trooper in Brigadier Cadogan's regiment and lost his arm at the battle of Blenheim. Was made quarter-master to Col. Wynne's regiment, which being sent for Ireland where no quarter-master is allowed on the establishment hath since carried arms in that regiment. To be a lieutenant. Recommended by Brigadier Cadogan."

"*Charles Ferebee*

"Served thirteen years as private gentleman and one year as corporal in Lt.-General Lumley's regiment and discharged his duty as became a soldier. Recommended by Lt.-General Lumley and Brigadier Howe."

"*Joseph Hampton*

"Hath served in Brigadier Cadogan's regiment the last war and this, and at passing the French lines received a wound in one of his hands, which is likely to deprive him of the use of it and incapacitated him for the horse service. Prays to be a lieutenant. Recommended by Brigadier Cadogan."

"*Nicholas Gorsuch,*

"Of Major-General Wood's regiment. Behaved very well at the battle of Hochstadt; and at forcing the French lines took a colour, for which his Grace promised to provide for him. Prays to be a lieutenant. Recommended by Major-General Wood."

"*William Bunting*

"Hath served eighteen years in the Army (twelve in Lt.-General Lumley's regiment, and six in the first troop of Horse Guards) and received seventeen wounds. Alleges he was recommended last year for a lieutenant's commission by Sir Walter St. John and the Countess of Lindsey."

[1] Christian name not forthcoming in the MS. Doubtless the Nathaniel Sandford appointed lieutenant in Colonel Thomas Stanwix's Regiment of Foot, 12th April, 1706.

"*Vernon Hawley*"

"Served seven years in the first Foot Guards, and behaved on all occasions very well, and particularly at both the battles in Germany; had his thigh broke by a cannon shot at Hochstadt, which being thought incurable by the chirurgeons at Nordling he was sent to the hospital at Chelsea, where he was perfectly cured. To be an ensign. Recommended by Major-General Withers, Col. Primrose, Col. Ferrers, Col. Durell."

Among signal acts of gallantry during Marlborough's campaigns special mention must be made of a daring feat performed by Sergeant William Littler in 1708:—[1]

"When the besieging army appeared before Lille the French outguards retired, and Sergeant Littler of the 16th Foot swam across the river with a hatchet, and cut the fastenings which held up a drawbridge, to enable a party to pass the stream, for which act of gallantry he was rewarded with a commission in the 3rd Foot, or the Buffs."[2]

In January, 1711, there being an increased demand for officers of experience to serve abroad, a Royal Warrant was signed by Queen Anne, directing "thirty sergeants of Our Army, whose experience in military affairs has inclined Us to employ them in Our Service on the foot of ensigns' pay, to take rank as lieutenants from 1st January, 1711."[3] Three of the fortunate sergeants belonged to the 1st Foot Guards, but one of the three (Thos. Cook) being detained in England to give evidence before the House of Commons, in an affair of the notorious Colonel Francis Charteris, had to surrender his commission.[4] Glancing over the names of these thirty rankers, we stumble on a surname which has lately added fresh lustre to the British Army and the British peerage—the name of Kitchener.[5]

In the seventeenth and eighteenth centuries it was customary for each troop of a cavalry regiment to have its own quarter-master, who received a commission signed by the colonel of his regiment. Generally, but by no means always, these cavalry quarter-masters were promoted from the ranks, and were selected by the colonels of their respective regiments.

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[1] Attained the rank of captain in the 1st Foot Guards, with the additional rank of lieut.-colonel, 26th April, 1740, and died 26th March, 1742. From a deposition made by Sergeant William Littler at Newbury, 12th January, 1706, now among the Duke of Portland's MSS. at Welbeck Abbey, it appears that Littler was in Captain Vicaridge's company in the 16th Foot in 1706.

[2] Cannon's "Records of the 16th Foot," p. 12. Sir F. W. Hamilton says Littler was a grenadier in the 1st Foot Guards when he performed above daring feat, and that he received an ensigncy in the Guards ("History of the Grenadier Guards," Vol. II., p. 34). These statements are certainly erroneous. In the MS. Army List for 1715 Littler appears as ensign in the 3rd Buffs, and his first commission in the Guards dates from 26th December, 1726, when he was appointed lieutenant.

[3] "Treasury Papers," 1711.

[4] "History of the Grenadier Guards," Vol. II., p. 45.

[5] Sergeant Richard Kitchener, appointed lieutenant in 1711, was on the half-pay list in 1722.

The following epitaph at Coventry records a notable instance of a cavalry quarter-master, a ranker, who served fifty-six years in the Army:—

"Here lieth the body of Arthur Manley, late quarter-master in the Queen's Royal Regiment of Horse, who served the Crown of Great Britain upwards of fifty-six years, from the 15th July, 1685, to the 24th August, 1741. He died June 7th, 1746, aged 78.

"The Israelites in desert wandered but two score;
But I have wandered two score sixteen and more
In dusty campaigns, restless days and nights,
In bloody battles oft-times did I fight,
In Ireland, Flanders, France, and Spain;
At last here lie my poor mortal remains."

"I served in the Foot ten years, and in the above Regiment of Horse upwards of forty-six years."[1]

Infantry quarter-masters always received commissions from the Sovereign, except when Commanders-in-Chief have been empowered to grant commissions and fill up vacancies, during times of war. Of the many hundreds of infantry quarter-masters who have been appointed from the ranks in the past, one instance must now suffice. In August, 1837, the officers of the 77th Foot presented their late quarter-master, John Powell, with a testimonial in plate of their respect and regard. Powell enlisted in the regiment in 1787, and was made quarter-master in 1810. He served at the siege of Seringapatam, and was badly wounded in the wrist. It is recorded that when Sir Archibald Campbell, who very soon after the 77th was formed became its adjutant, inquired immediately after he succeeded to the regiment as colonel, in 1835, if the only name he could recognise in the list of the officers "was honest John Powell." In recognition of Powell's honourable and meritorious service, both in the ranks and as a non-combatant, Lord Hill brought this officer to the notice of William IV., who appointed Powell a Military Knight of Windsor.[2]

The system of promoting deserving non-commissioned officers to adjutancies of cavalry and infantry regiments was greatly in vogue from 1700 to 1855. The plan worked well, especially in the cavalry. In the last-named service the adjutant generally received the rank of cornet on promotion from sergeant-major, while the infantry adjutant received an ensign's commission. On the field of battle the regimental adjutant was continually exposed to danger. At Minden, Lieutenant and Adjutant John Widdows, of the 51st Foot (an ex-sergeant-major of the 37th Foot), was killed, and was succeeded as adjutant by Sergeant-Major John Jervis of the same regiment. At Waterloo four cavalry adjutants were killed and one wounded, while the infantry had one adjutant killed and nine wounded. So far as can be ascertained these same officers were all rankers. And in the Crimea several cavalry adjutants were ex-sergeant-majors, among them being Lieutenant and Adjutant Wm. Miller, of the

[1] *Naval and Military Magazine*, Vol. III., pp. 34 and 35.

[2] *United Service Journal*, August, 1837.

Scots Greys, and Lieutenant and Adjutant Archibald Weir, of the Inniskilling Dragoons. These two officers took part in the Heavy Brigade charge at Balaclava, and high above the din of battle Miller's resonant voice was heard shouting: "Rally—the Greys!" Regimental Sergeant-Major Daniel Moodie, of the Greys, succeeded Miller as adjutant, and had the rank of cornet given him in 1854.

The purchase system was in full swing all the last and most of the present century. This fact accounts for comparatively few rankers in the olden days having attained the rank of field officers. Promotion, except in rare instances, meant the outlay of a considerable sum of money, and this barred many able officers form rising in the Service. Also the power to sell a commission which had cost him nothing, was often too much for the subaltern recently promoted from the ranks. He would take the tempting bait offered him by some moneyed youth who wished to enter the Army, and leave the Service for ever. In many cases the ranker had no chance of advancement because he was a middle-aged man, and possibly a battered veteran, when appointed a cornet or ensign, as the case might be. If he stayed on in the subordinate position to which he had been raised from the ranks, the time came when he was superannuated and had to retire pensionless. Here are two cases in point taken haphazard from one of the military entry books:—

"Ensign Bruce resigns his commission *being old and infirm*."

"Lieut. Sprott *superannuated*."

It was probably a ranker who wrote the following reminder to one of the English Ministry, from Minorca, in October, 1758:—

"My Lord,

"I was a lieutenant when General Stanhope took Minorca; for which he was made a Lord. I was a lieutenant when General Blakeney lost Minorca; for which he was made a Lord. I am a lieutenant still.

Yours, etc."[1]

As Minorca was taken by Stanhope in 1708, the cutting irony of the above epistle is self-apparent.

From a London newspaper (*Evening Post*), in 1745, we read that six sergeants of the Foot Guards were offered lieutenants' commissions if they would go out to India, which offer they accepted. But while the Foot Guards supplied rankers to other regiments, and independent companies, the officers of this *corps* 8'*élite* viewed with great disfavour, the advancement of one of their own non-commissioned officers to an ensigncy in the Guards. Major-General John Salter, many years lieut.-colonel of the 1st Foot Guards, had been a private in this corps, and at his death, in 1788, the following notice appeared in a contemporary paper:—

"August 4th, 1788, died at Turnham Green, in his 78th year, John Salter, Esq., a major-general of his Majesty's Forces and lieut.-colonel of the 1st Regiment of Foot Guards. He was originally a private in the Guards, and was taken from the ranks

[1] This letter is printed in the "Records of the 51st Light Infantry."

by the Duke of Cumberland. His Highness caused him to be made a sergeant, and soon after was so pleased with his voice and manner of giving the word of command, that he gave him a commission in the same regiment. This promotion gave great offence to the other officers, who refused Mr. Salter their countenance; thus circumstanced he waited upon the Royal Duke and stated the awkwardness of his situation. 'Well, well,' said the Duke, 'meet me to-morrow on the parade.' The Duke came down earlier than usual, and going up to the colour-stand, his Highness saluted Lord Ligonier and the officers of the regiment, who were all in conversation together; but directing his eyes around, as if by accident, he noticed poor Salter alone. 'What,' said His Highness, 'has that officer done that he is drummed out of your councils?' and going up to him, took him by the arm, and walked up and down the parade with him in the presence of the different battalions and other officers. Lord Ligonier, at this time accosting the Duke, entreated his Highness's company to dinner. 'With all my heart,' said the Duke, 'and remember, Salter comes with me.' His Lordship bowing, said, 'I hope so.' After this ordeal, Salter was well received by all the brethren of the blade, and by his merits raised himself to the rank he held at his death."

During the Seven Years' War, when it was thought necessary to lighten the darkness of certain Militia regiments, in Great Britain, by giving commissions in said battalions to a few experienced sergeants from the Regulars, the officers of the Duke of Richmond's regiment resented the advent of Lieutenant Atkins, a ranker, whom they called a "sergeant-lieutenant." But this exclusiveness was the exception and not the rule.

The outbreak of war with France, in 1793, necessitated a considerable increase to the British Army. During the succeeding twenty years, it was less uncommon than heretofore to bestow commissions on deserving and experienced non-commissioned officers. The junior officers of the nine regiments raised for service in the West Indies, in 1795, were largely composed of rankers. Many of these poor fellows enjoyed their superior rank but a short period, as those who were not killed in action with the French, often fell victims to the epidemics which periodically swept over the West Indies.

An amusing and authentic story, illustrative of the callous greed of West Indian undertakers in olden days, is told of Captain Hunter Blair (brother to Sir James Hunter Blair, Bart.), who accompanied his regiment to the West Indies the end of last century, and happened to reach his plague-stricken destination at a time when Europeans were dying like rotten sheep. The morning after disembarkation Captain Blair, who was a very tall and corpulent man, went down to the quay to superintend the unlading of regimental baggage and stores. Whilst thus employed he became aware

Letter from Sir George Savile to Sir James Lowther, 1st February, 1760. MSS. of the Earl of Lonsdale.

that a civilian, a native, was eying him very earnestly, and following him about. Annoyed at this stranger's inquisitiveness, Captain Blair went up to him and asked him if he wanted anything? "I was just wondering, sir," replied the native, "if I had a coffin large enough for you!"[1] Captain Blair took the hint, and speedily returned to England on urgent private affairs.

It may be said of rankers in the past, as well as in the present, that they almost invariably won their commissions by their own intrinsic merit, and not through favouritism. Two cases, however, may be cited where two sergeants owed their promotion to good looks and good manners. In "Recollections of Military Service, 1813-1815," by Sergeant Morris, 2nd Bn. 73rd Regiment, the gallant author writes:—

> "Our light company was, for its number, the finest set of men I ever saw, being a mixture of English, Irish, and Scotch, commanded by a captain who had risen from the ranks. Report said that he was indebted for his promotion to his beautiful black eyes and whiskers, which had attracted the notice of his colonel's lady, who had sufficient influence to obtain for him a commission as ensign. He was now captain, and though his whiskers were tinged with grey, his eyes possessed all their former fire and brilliancy."[2]

The second case was that of Sergeant John Johnston, of the Corps of Military Artificers, who was employed on engineering work at Brighton in 1795:—

> "During the formation of one of the bridges Mrs. Fitzherbert was riding by alone. Sergeant John Johnston, who was in charge of the party, recognising the favourite, very politely touched his cap in compliment to her, and she immediately pulled up. After asking a variety of questions concerning the work, she praised the men for their exertions, and desired that each should receive an extra day's pay. For this purpose she gave the sergeant sufficient money, and taking a note of his name commended him for his civility and promised to remember him. Very shortly afterwards he received the offer of an ensigncy in a regiment in the West Indies, and sailing thither in November, received his commission in the 29th Foot, 1st May, 1796. It was supposed that Mrs. Fitzherbert, true to her promise, had exerted her influence and obtained this appointment for him."[3]

It was a common saying during the Peninsular War that "the British soldier fought in the cold shade of the aristocracy," and had small chance of rising in his profession. Those who made this sweeping assertion forgot to point out that an enormous percentage of the recruits who joined Wellington's army in Spain, and Portugal, were uneducated men who could neither read nor write, and were unfitted to be made non-commissioned officers. Even so recently as 1842 statistics show that "thirty to fifty

[1] Kay's "Edinburgh Portraits," Vol. I., p. 92.

[2] Third edition (1846), p. 20.

[3] Connolly's "History of the Royal Sappers and Miners," Vol. I., p. 80.

per cent. of the men who enlisted were unable to read with profit or satisfaction, or at any rate, without much difficulty."[1] It was a well-known fact that Wellington, unlike Marlborough, was always averse to promotion from the ranks, and discountenanced it. When we remember the frightful excesses committed by Wellington's soldiers after the storming of Ciudad Rodrigo and Badajos, during the retreats from Madrid and Burgos, and at the taking of San Sebastian, we can make allowances for the Iron Duke's assertion that "officers promoted from the ranks were unable to resist drink, and were therefore not to be trusted."[2] Napoleon said, alluding to the class of the population from which the British Army was chiefly recruited, "that only middling non-commissioned officers could be drawn from the British ranks."[3] These facts may explain why comparatively so few commissions were given from the ranks during the early campaigns of this century.

For special bravery at Waterloo in capturing the eagle of the 45th French Regiment, Sergeant Charles Ewart, of the Scots Greys, was rewarded with an ensigncy in the 5th Royal Veteran Battalion. Corporal Francis Stiles, of the 1st Dragoons, who gallantly helped to capture the eagle of the 105th French Regiment, at Waterloo, was appointed ensign in the 6th West India Regiment. And for daring intrepidity at the battle of Sobraon, in 1846, where he planted, under a heavy fire, the regimental colour of the 31st Foot upon one of the towers of the enemy's intrenchments, Sergeant Bernard McCabe of this corps was promoted ensign in the 18th Royal Irish Regiment of Foot on the 8th May, 1846. For his gallantry at the battle of the Alma, Sergeant Luke O'Connor received a commission in his own regiment, and the Victoria Cross which he had so nobly won while preserving the Queen's Colour of the Royal Welsh Fusiliers. This officer is now a major-general on the retired list.

The number of officers who have worked their way up from the ranks to the command of British regiments is very few. Colonel Sir John Elley, K.C.B., who commanded the Royal Horse Guards at Waterloo, where he was wounded, began life as a trooper in the Blues, and after holding the quarter-mastership, received his commission as cornet in 1791. He died in January, 1839, a lieut.-general, honorary colonel of the 17th Lancers, and governor of Galway. It is recorded of Sir John Elley in Scott's "Letters of his Kinsfolk" that "there were found on the field of Waterloo more than one of Napoleon's cuirassiers cleft to the chin by the stalwart arm of this gallant officer."

The other cavalry regiments commanded by officers from the ranks have been the 14th Hussars, which had for its chief the gallant Colonel Charles Cureton, who received his commission while a lad in the Peninsula and was killed in the cavalry charge at Ramnuggur. And the 8th Hussars was for some years commanded by Colonel Edward Seager, who was promoted from sergeant-major to a cornetcy in same regiment 17th September, 1841, and rode at Balaclava as captain of a troop. At the time of

[1] Report by Henry Marshall, Esq., Deputy-Inspector-General of Army Hospitals, printed in the *United Service Magazine*, 1842, Pt. I.

[2] "Conversations with the Duke of Wellington," by Earl Stanhope, p. 13.

[3] Memoir dictated to Count Montholon.

the Crimean War the 30th Foot was commanded by Colonel Charles Sillery, who had been promoted from sergeant-major in the Inniskilling Dragoons in 1828. This officer held the appointment of commandant of the hospital at Scutari until the conclusion of the war. He subsequently served in the New Zealand War of 1860-61. Colonel Isaac Moore, who died in command of the Depôt Battalion, in 1868, held the lieut.-colonelcy of the 97th Foot from November, 1855, to November, 1856, and obtained every step in the regiment from sergeant-major. The 1st West India Regiment was commanded by Lieut.-Colonel John McAuley, who was promoted from quarter-master-sergeant in 1855, and obtained the lieut.-colonelcy of the 1st West by purchase in 1871. The late 4th West was commanded by Colonel Edward Conran, who had risen in the 3rd West; and the 5th West by Colonel William Lyons, formerly sergeant-major of the 73rd Foot, who subsequently was at the head of the London Recruiting District. Lieut.-Colonel Peter Macdonald, who was commissioned in 1839 from sergeant-major in the Rifle Brigade, obtained the command of the 2nd Bn. 13th Light Infantry, 19th December, 1865, and retired a few years later, receiving over £4,500 over-regulation from Government.[1] Major-General John McKay, who succeeded to the command of the 2nd Bn. 12th Foot, in 1871, had been commissioned quarter-master, with rank of ensign, 25th August, 1854, at the School of Musketry, Hythe, from sergeant 19th Foot. Major-General William McBean, V.C., who commanded the 93rd Highlanders for some years, was promoted ensign from colour-sergeant in same regiment, 11th August, 1854, and obtained all his steps without purchase. As lieutenant and adjutant of the 93rd, McBean won the Victoria Cross "for distinguished personal bravery in killing eleven of the enemy with his own hand, in the main breach of the Begum Bagh, at Lucknow, on 11th March, 1858." Lastly, Colonel (afterwards Major-General) James Campbell, who was promoted second lieutenant from sergeant-major Royal Artillery, 1st July, 1847, was appointed colonel of the Coast Brigade,[2] Royal Artillery, 1st April, 1865.

The reader may have noticed that of all the commissions from the ranks enumerated in the foregoing pages only one non-commissioned officer from the Royal Artillery is named as having attained to any command of importance, viz., the colonelcy of the Coast Brigade of Royal Artillery, in 1865, which corps no longer exists. The Coast Brigade was officered by deserving non-commissioned officers of the Royal Artillery, who were excluded from promotion in their own particular corps. A military writer in the *United Service Magazine* for 1842 points out "the incongruity of bestowing commissions on non-commissioned officers of cavalry and infantry, and excluding the artillery from this boon." The same writer also remarks that "the ordnance non-commissioned officers are at all events practically equal to their contemporaries in the other Services; and from the theoretical instruction they have received, in their particular corps, far, very far, pre-eminent in intellectual acquirements."[3]

[1] *Army and Navy Gazette*, 6th November, 1875.

[2] Established 4th November, 1859.

Pt. II., p. 163.

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made: Captains—W. Des V. Hamilton to Command of Portsmouth Fleet Reserve; R. N. Ommaney to Staff-Captain of Devonport Dockyard and Queen's Harbour-Master; M. T. Smyth to "Egeria"; F. C. M. Noel to "Wallaroo"; A. G. Curzon-Howe, C.B., C.M.G., to "Ocean"; M. P. O'Callaghan, C.B., to "Britannia." Commander—A. E. A. Grant to "Racoon."

H.M.S. "Polyphemus," the only torpedo-ram in the Service, which for the last twelve years has been stationed in the Mediterranean, has at last been brought home, and was paid off at Chatham on the 4th ult. The second-class cruiser "Amphion" arrived at Plymouth from the Pacific on the 13th ult., and will be paid off at Devonport. The first-class battle-ship "Anson," the last of the "Admirals" to return from the Mediterranean, was paid off at Devonport on the 31st ult. H.M. sloop "Nymphe" arrived at Spithead on the 14th ult. from the Mediterranean and will pay off at Portsmouth. The second-class cruiser "Pique," commissioned at Devonport for service on the China station on the 15th ult. On the 19th ult. the first-class gun-boat "Sparrow" paid off at Sheerness, from the West Coast of Africa. The first-class cruiser "Europa" left Portsmouth on the 19th ult. with a new crew for the "Ramillies" at Malta. The second-class cruiser "Latona" arrived at Portsmouth on the 27th ult. with the relieved crew of the "Indefatigable," from Bermuda. The third-class battle-ship "Invincible," one of the central-battery ships of the "Audacious" class, is to be converted into a torpedo-school ship, and is to be stationed at Sheerness, where the Admiralty have determined to establish another torpedo-school.

Floating-out of "Pandora."—The new third-class cruiser "Pandora," which was laid down in No. 11 dock at Portsmouth on January 3rd, 1898, was floated on the 17th ult. This vessel is one of two third-class unsheathed protected cruisers now building, the other, the "Pioneer," being under construction at Chatham. Nine similar third-class cruisers, of a slightly less displacement, have already been launched and completed. The principal dimensions are:—Length between perpendiculars, 305 feet; length over all, 318 feet 6 inches; beam, extreme, 37 feet; mean draught of water, 13 feet 6 inches; displacement, 2,200 tons.

A steel deck sloped at the sides, and varying in thickness from ½ inch to 2 inches, has been worked throughout the length of the ship in the neighbourhood of the water-line, and affords protection to the engines, boilers, magazines, etc. The "Pandora" will be propelled by twin screws, each driven by an independent set of vertical triple-expansion engines, capable of developing, at the working pressure of 250 lbs. to the square inch, an I.H.P. of 3,500, or 7,000 for the two sets of engines. With this H.P. a speed of about 20 knots will be realised. Steam will be supplied by eight water-tube boilers of the Thornycroft type. These engines and boilers are being built in Portsmouth yard. The quantity of coal carried at the above draught is 250 tons, although provision is made for stowing a much larger amount.

The armament will consist of eight 4-inch Q.F. guns—two being on the forecastle, two on the poop, and the remainder on the broadside—eight 3-pounder Q.F. guns, and three ·45-inch Maxims. Two above-water torpedo-tubes will be carried. These tubes will be armoured, the thickness of armour varying from 1 inch to 3 inches.

The complement of the "Pandora" when commissioned will be 224 officers and men.

Steam Trials.—The new first-class battle-ship "Glory" has commenced her trials, but after a 30 hours' run at one-fifth power to test coal consumption the result was found to be unsatisfactory, the coal consumption being much in excess of what it ought to have been; before recommencing her trials, which have not yet been concluded, some alterations were made in the grate area of her furnaces.

The new first-class gun-boat "Britomart," built by Messrs. Potter & Co., Liverpool, has completed her steam trials satisfactorily. The results of the 30 hours' trial were highly satisfactory. The mean results for the 30 hours were:—Steam in boilers, 220 lbs.; at engines, starboard 187 lbs., port 208 lbs.; vacuum, starboard 26 inches, port 25·4 inches; revolutions, starboard 241·3, port 238·1; I.H.P., starboad 345, port 322—total, 667; air pressure, $\frac{1}{24}$ of an inch; speed, 11·2 knots; coal consumed per I.H.P. per hour, 2·32 lbs. The eight hours' natural-draught steam trial took place off Plymouth, a mean speed of 13 knots per hour being attained with an I.H.P. of 900. The particulars were as follows:—Steam in boilers, 208 lbs.; at engines, starboard 188 lbs., port 196 lbs.; revolutions, starboard 274·8, port 276·4; vacuum, starboard 26·8, port 25·0; I.H.P., starboard 476, port 481—total 957; air pressure in stokeholds, ·5 inch; coal consumption per I.H.P. per hour, 2·521 lbs.

At the four hours' forced-draught trial the results were:—Steam in boilers, starboard 224 lbs., port 224 lbs.; steam at engines, starboard 198 lbs., port 198 lbs.; air pressure, 1·2 inches; vacuum, starboard 25·1 inches, port 24·6 inches; revolutions, starboard 309·6, port 313·3; I.H.P., starboard 661, port 708—total, 1,369; speed, 14·6 knots.

The torpedo-gunboat "Seagull" has completed her sixth run of 1,000 miles. On this occasion the actual mileage was 903, but the weather was thick and heavy seas broke over her in such volume that there were 6 inches of water on the mess deck, so that she was allowed to go into harbour. So far the trials have not demonstrated the economy of the Niclausse water-tube boiler, with which the "Seagull" is the only ship in the British Navy to be fitted. The first four trials were at 1,350-I.H.P., and the coal consumption worked out at 1·9 lbs. per unit of power per hour. The fifth and sixth trials were at 1,600-I.H.P., and here again the consumption began with 1·9 lbs., but at the last run it was brought down to 1·84 lbs.

The new sloop "Rosario" has completed her eight hours' full-power trial with the following results:—Steam pressure in boilers, 235·4 lbs.; steam pressure at engines, 185·4 lbs.; revolutions, 205·3 per minute; I.H.P., high 400·5, intermediate 524·5, low 573·0—total, 1,498; speed 13·6 knots. The I.H.P. was 98 in excess of the power required by the Admiralty specification.

During the assembly of the Naval Jubilee Review fleet at Spithead in 1897 the little "Turbinia" created a sensation by daily steaming through the lines of the squadrons at what was claimed to be a speed of 30 knots an hour. The results attained by the "Turbinia" were such that the Admiralty decided on having a similar vessel built for experimental purposes, and in order that a fresh record might be established it was proposed to have the vessel designed to attain a speed of 33 knots an hour. The order for this vessel, now called the "Viper," was placed with Messrs. Hawthorn, Leslie & Co., Newcastle-on-Tyne, with instructions to fit her with engines on the turbine principle by Parson's Steam Turbine Company. In view of the marvellous speed for which she was intended the vessel occupied the building slip much longer than an ordinary destroyer, and although designed in 1897 it was not until September last that she was launched. Since then the work of placing her machinery on board has gone forward very rapidly, and early last month her constructors had the pleasure of reporting her ready for steaming. The propelling machinery consists of four steam turbines, each driving a separate shaft fitted with two propellers of 3 feet 4 inches diameter, and 4 feet 6 inches pitch. The speed of the turbines at the maximum power is 1,000 revolutions per minute, steam being supplied by four Yarrow water-tube boilers.

The vessel has a length of 210 feet, with 21 feet beam, and is built on lines which are an exact copy of the destroyers of the "Mermaid" type. The preliminaries having been completed, the long looked for and anxiously awaited steam trial took place on the 12th ult. Shortly after 8 a.m. the "Viper" left her berthing at Hebburn, and quietly steamed down the Tyne, her steering capabilities being tested *en route* and found to be perfect. The large staff of Admiralty engineers' and contractors' officials cared but little for the auxiliary machinery; they were anxious only to know if the "Viper" was a success or a failure, and after getting a clear passage the speed of the turbines was gradually worked up. Long before they attained their maximum power everyone on the little craft's deck had to clutch a support to enable him to keep his feet. For three hours the "Viper" went for all she was worth, and at the finish a mean speed of 35½ knots an hour had been realised. The result was astonishing, and on being verified by the officer of the deck and the chief engineer, congratulations were general. The "Viper's" speed is just 5 knots an hour higher than that of the "Turbinia," which has hitherto held the record. The marvellous rate of steaming will be better appreciated when it is stated that 35 knots is just 40 land miles an hour. The "Viper" will now be sent to Devonport, where she will be equipped for sea service and placed in commission for a series of experimental trials.—*Times*, *Naval and Military Record*, etc.

Torpedo Cruisers.—The following interesting suggestion from an officer on the Mediterranean station, writing under the pseudonym of "Junius Junior," appeared lately in the *Naval and Military Record*:—

The fleet exercises carried out this year (1899) by the Mediterranean Squadron, classed in two divisions for the sake of elucidation, viz., (*a*) battle-ships and cruisers, (*b*) torpedo-flotilla, consisting of the "Thetis" (senior officer), "Hazard," "Harrier," "Salamander," four torpedo-boat destroyers, and four torpedo-boats (specially commissioned in September), have shown the want of a vessel that might aptly be termed a torpedo-cruiser. For a torpedo-cruiser these particulars are premised:—

1. Speed.
2. Offensive power, (*a*) torpedoes, (*b*) guns.
3. General adaptability to act in conjunction with destroyers and torpedo-boats.

a. For Attack.—The size should not be such as to make the cruiser a conspicuous mark, but should be sufficient to allow of her rendering temporary assistance to the torpedo-boat destroyers and torpedo-boats, either in *personnel* material, torpedoes, or stores.

b. For Defence.—She should have offensive power not only to destroy the torpedo-boats and torpedo-boat destroyers of a hostile fleet, but also to protect her own flotilla from similiar attack.

c. Speed of sufficient purpose to act with destroyers, except when the latter are doing their utmost, and also to enable her to escape with her convoy should any large hostile cruiser give chase.

d. Maintenance.—Reserve of water for her own boilers should be sufficient to allow of occasional supplies both to destroyers and torpedo-boats.

e. Coal capacity should be in relation to her two-fifths I.H.P., viz., about one-fifth of displacement.

f. *Personnel* would be to a large extent "specialists:—Commander (in command) lieutenant (T), lieutenant (G), short course; lieutenant (N), gunner, chief engineer, engineer, artificer engineer, surgeon, paymaster.

Given these qualifications, each torpedo-cruiser would be able to act as parent ship to three destroyers or about five torpedo-boats when the flotilla is under actual conditions of service.

A consideration of the foregoing brings us to details of the type of vessels proposed. These are as follows:—Dimensions, length 300 feet, beam 30 feet;

displacement, 1,500 to 1,600 tons; coal capacity, 300 to 400 tons; engines, twin-screw; I.H.P., 10,000; speed, 26 knots (approximately); armament, two 4-inch Q.F., four 12-pounders, four 6-pounders, two Maxims; torpedoes, 12; complement, 150.

The nearest approach to this type of vessel (excluding the "Scout" and "Fearless") are the torpedo-gunboats of the "Hazard" and "Salamander" classes. The normal cruising speed of the torpedo-flotilla was, however, limited by these vessels, whose maximum seagoing speed under favourable conditions was 14 knots, and even this speed was reduced at times by bad coal and heated funnel casings to such an extent that they began to bulge and the paint flaked off. The "Salamander," with her new boilers is appreciably faster than the "Hazard" type, but it is doubtful if she is strongly enough built to withstand the vibration long at her maximum speed of 20 knots.

A glance through the list of ships owned by foreign Powers shows that Italy is the only one with any vessels of this description, viz., the "Agordat" and a sister ship of 1,320 tons, 23 knots speed, and corresponding in some other respects to the details given above.

It would be as well that the Admiralty, which has so conclusively demonstrated its belief in torpedo-boat destroyers, should provide as quickly as possible for their most efficient use under actual conditions of service by building vessels to act with them in *loco parentis*.

FRANCE.—The following are the principal promotions and appointments which have been made: Capitaines de Vaisseau—F. J. Pissère to "Formidable"; E. A. Marquer to "Amiral-Duperré"; M. De Fauque de Jonquières to "Masséna"; M. L. M. Vidal to "Foudre"; M. J. Baudry-La-Cantinerie to be Chief of the Staff in the Active Squadron of the Mediterranean Fleet. Capitaines de Frégate—P. Adigard to "Fleurus"; E. P. E. Salaun to "Cassini"; L. J. Dufaure de Lajarte to Command of Fixed Defences at Brest; E. H. Ropert to "Linois"; A. Somborn and O. E. Le Clerc to Capitaines de Vaisseau.—*Journal Officiel de la République Française.*

General.—One of the important changes foreshadowed in the composition of the Mediterranean and Channel Squadrons has now been carried out; the new first-class battle-ships "Charlemagne," and "Gaulois" having arrived at Toulon from Brest to join the first-named fleet, and the "Masséna" and "Carnot" having arrived from Toulon at Brest to join the latter; the "Charlemagne" and "Gaulois" made the passage round in five days, averaging 15 knots, which is a very good record for battle-ships, only beaten by that of the "Renown" from Bermuda to Plymouth, the engines worked smoothly, there were no hot bearings, and the ventilation of the stokeholds perfect; their first stoppage was at Marseilles, where they were coaled as rapidly as possible, in order to test the coaling facilities of the port. At Brest preparations are being made on board the "Masséna" for the reception of Vice-Admiral Ménard and his staff. In consequence of certain difficulties which have been experienced during the trials of the "Narval," and which have not yet been overcome, work has been temporarily stopped on the two sister vessels "Sirène" and "Triton," building at Cherbourg. The difficulty in the "Narval" is to regulate her plunging, as during her recent trials she has indulged in some curious and dangerous antics, her performances generally having been of a very erratic nature. The *Yacht* calls attention to the fact that there is a tendency on the part of the public, in their ignorance of all the facts, to exaggerate at present the value of these boats, which even for the defence of harbours, where they are stationed, will have to be managed with extreme care and skill if they are to be of any real use. The "Goubet" No. 2, however, seems to have been making some very satisfactory trials at Cherbourg, plunging gently, and maintaining her equilibrium at any depth below the surface, besides which her gyroscope seems to

have enabled her to manœuvre successfully just below the surface of the water, without her presence being detected. The transport "Tonkin" is, it is now finally settled, to relieve the "Iphigénie" as the sea-going training-ship for cadets.

The cruisers "Amiral-Charner" and "Friant" are to be sent to Rochefort for repairs to their boiler tubes.

The Budget Estimates for 1900.—M. de La Porte has presented to the Chamber of Deputies his report on the Estimates submitted by the Minister of Marine for 1900. The Committee refuse to sanction the construction of the two first-class battle-ships "A 8" and "A 10" on the ground that they would add still more to the heterogeneousness of the fleet, which is already sufficiently marked; they therefore request the Minister of Marine to make certain changes in the proposed programme. They have consented, with some reluctance, to approve the construction of a new first-class armoured cruiser of 12,416 tons, but they point out that, according to the plans, this vessel, although 1,000 tons larger than the "Jeanne d'Arc," is to have less powerful engines, less speed, and a smaller radius of action, the more important qualities necessary for a good cruiser having been subordinated to a slightly superior armament, a little better protected. The Committee assume that the 1896 shipbuilding programme is practically dead. Even the naval authorities did not pursue its execution. That programme included the construction of 220 units of various values—namely, six 12,000-ton battle-ships, nine first-class cruisers, eight protected 4,000-ton cruisers, three 2,500-ton protected cruisers, three despatch-boats, four gun-boats, ten torpedo-avisos, twenty-five torpedo-boat destroyers, thirty-eight ocean-going torpedo-boats, twelve coast-defence torpedo-boats. These vessels were to cost 621,672,447 francs. (£24,826,498). Only, however, 337,700,175 francs (£13,508,007) of this programme, being already in hand, will be carried out. It will be replaced by the new programme which the Ministers have placed before the Chamber.

M. de La Porte makes some pregnant remarks as to the relative cost of ship-building in France and England, pointing out that the "Majestic" (14,900 tons) cost 24,390,000 francs (£975,600), while the "Charlemagne" (11,292 tons), 3,600 tons less, cost 26,405,592 francs (£1,056,224), and "A 8," one of the two battle-ships the Minister wished to construct, of 14,800 tons, was to cost 35,542,704 francs (£1,421,708,) or nearly 50 per cent. more than the English ship. Again, the "Canopus" (12,950 tons) cost 22,158,000 francs (£886,320), while the "Suffren" (12,728 tons) is to cost 29,889,080 francs (£1,195,563), or nearly 35 per cent. more, labour for the "Canopus" costing 396 francs per ton, as against 436 francs for the French ship. After making some important modifications, the Estimates for new constructions remained fixed at 103,682,331 francs (£4,147,293), which is somewhat below the average for the last few years.

The New Programme.—The Government proposals for the increase of the Navy and defence of the coasts and coaling stations which have been drawn up by the Superior Council of the Navy has been laid before the French Chambers.

The proposed new vessels to be constructed are:—6 first-class battle-ships, 5 first-class armoured cruisers, 28 destroyers, 112 torpedo-boats, 26 submarine torpedo-boats, giving a total of 177 vessels of all classes. When completed, this new programme, with the vessels now under construction or completed is to give the French Navy a force of:—28 first-class battle-ships, forming four squadrons of 6 battle-ships each, with 1 in reserve for each squadron; 24 first-class armoured cruisers, forming 8 divisions of 3 cruisers each, besides other cruisers; 52 destroyers, 263 torpedo boats, 38 submarine torpedo-boats. The cost of the 177 vessels now proposed is 476,136,000 francs (£19,045,440), to this must be added a sum of 235 million francs (£9,400,000) necessary for the completion of the vessels already under construction on 1st January, 1900, giving a total for new constructions of £28,445,440. The two programmes will be fully completed in 1907, but by 1905 the following vessels will be ready:—2 out of the 6 battle-ships, 3 out

of the 6 armoured cruisers, 20 out of the 28 destroyers, 76 out of the 112 torpedo-boats. All the submarine boats. As regards the ships now under construction 1st January, 1900, these will be completed in 1903. The battle-ships proposed are to be vessels of 14,865 tons displacement, with an effective speed of 18 knots and a radius of action of 4,000 miles; their plans are by M. Bertin, director of naval construction. They will have an armoured belt of Harveyized steel 30 centimetres (11·8 inches) thick to a height of 2·50 metres (8 feet) above the water-line, and 10-centimetres (3·9-inch) armour will cover the remainder of the vessel. The principal armament will be four 305-millimetre (12-inch) guns in two armoured turrets 28 to 32 centimetres (8½ to 9½ inches) thick. The auxiliary armament will include eighteen 164-millimetre (6·5-inch) guns. The armoured cruisers will have a displacement of 12,600 tons and an effective speed of 22 knots. The destroyers will be of the "Durandal" type, and the torpedo-boats will be first-class boats of 80 tons.

The *Exposé des Motifs*, or explanatory statement as we should call it, which is presented with the above, says:—

"It has been too often forgotten that though it may not be necessary for us to attempt to compete with our maritime rivals in the number of our vessels, that we should none the less take care that those we have are ship for ship not inferior to others in quality and power; and as the progress of naval science now admits of a more precise determination of the necessary facilities for each class of ship, we should be careful in the future only to construct vessels of the most approved types and also that these are pushed on without delay.

"It is not only for the protection of our ports and for giving battle that large battle-ships are required, but also to support our cruisers when giving chase to the enemy's smaller vessels or in pursuit of his commerce; when this pursuit is carried out in closed waters, like the Mediterranean and the Channel. Battle-ships may also, by creating a diversion in a blockading fleet facilitate the despatch and return of our cruisers to their ports. We shall also be sadly disillusioned if we think we can replace the large battle-ships of a modern fleet by armoured cruisers, as if they, by their superior speed, are able to avoid an action with a battle-ship. They are also incapable of interfering with the offensive action of the latter."

For new docks and other engineering works the following sums have been apportioned to the various arsenals in France, Corsica, Algeria, Tunis, Saigon, and Dakar.

	Francs.
Cherbourg	27,700,000
Brest	29,750,000
Lorient	850,000
Rochefort	5,150,000
Supplementary expenses in above five ports	3,000,000
Bizerta	38,000,000
Mers-el-Kebir and Cape Matifow	2,000,000
Saigon and Dakar	11,000,000
	117,450,000 (£4,698,000)

The *Projet de Loi* for expenditure on Home Coast Defence is as follows:—

"The general programme of expenses by the Minister of War for the defence of the coasts, amounting to 85,000,000 francs, is approved to be apportioned as follows:—

	Francs.
Artillery	48,950,000
Military Engineers	32,000,000
Ammunition	1,750,000
Railways..	2,300,000
	85,000,000 (£3,400,000)"

As regards Colonial Defence, the *Exposé des Motifs* says :—

"It is superfluous for the Government to dilate on the necessity which exists for rapidly putting our distant colonial possessions in a state of defence. The Government therefore presents the following definite programme to Parliament :—

"1. The construction, completion, and armament of works and fortifications at the Naval Coaling Stations (*Points d'appui*).

"2. The organisation of mobilisation stores and erection of works for protecting certain points from the attack of isolated cruisers.

"3. The formation of Artillery and Ammunition Reserves, which the distance of our possessions renders indispensable."

The expenses of the above are allotted as follows :—

	Francs.
1. Colonial Fortresses	45,000,000
2. Mobilisation Stores	2,000,000
3. Artillery Munitions	8,000,000
	55,000,000 (£2,200,000)

Telegraph Cables.—It is also proposed to lay down the following entirely French submarine telegraph lines :—

Line between Oran-Tangiers-Teneriffe-Saint Louis.
" " Huê to a point north of Hong-Kong not yet determined.
" " Tanatave and Réunion.
" " French Benin Ports and French Congo.

The grand total therefore of the Government proposals connected with the Navy and Colonies is :—

	£
Increase of the Navy	28,445,440
Engineering Works, etc., at Dockyards	4,698,000
Defence of Home Coasts	3,400,000
Defence of Coaling Stations	2,200,000
Submarine Cables (not stated)	—
	£38,743,440

—*Le Temps*, *Le Yacht*, and *Rapport du Budget Général de l'Exercice 1900 (Ministère de la Marine), fait par M. de La Porte.*

ITALY.—Rear-Admiral Marchese has struck his flag on board the "Flavio Gioia," having been relieved of the command of the Training Squadron; Rear-Admiral Di Brocchetti, in command of the Trans-Atlantic Naval Division, has transferred his flag from the "Fieramosca" to the "Cristoforo Colombo," and Rear-Admiral Grenet, commanding the Naval Division in China, has transferred his flag from the "Etna" to the "Carlo Alberto."

New Disposition of the Fleet.—A change has lately been made in the distribution of the ships among the different home ports, which is now as follows :—

At Spezia.

First-class battle-ships—"Italia," "Lepanto," "Re Umberto," "Sicilia," "Sardegna," "Duilio," "Dandolo," "Ruggierio di Lauria," "Francesco Morosini," "Andrea Doria," "Ammiraglio di Saint Bon," "Filiberto," "Benedetto Brin," and "Regina Margherita."

First-class armoured cruisers—"Carlo Alberto," "Vettor-Pisani," "Garibaldi," "Varese," and "Ferruccio."

Torpedo-boat destroyers—"Folgore," "Saetta," "Fulmine," "Lampo," "Freccia," "Strale," "Dardo," and "Delphino."

Sea-going torpedo-boats—"Aguila," "Avvoltoio," "Falco," "Nibbio," "Sparviero," "Condore," and "Pellicano."

Torpedo-boats—Nos. 60 to 75, 80 to 117.

First-class special-service ships—"Trinacria" and "Eridano."

Second-class special-service ships—"Formidabile," "Terribi espucci,' "Flavio Gioia," and "Volta."
Third-class special-service ships—"Rapido," "Messaggero," "Caracciolo," "Cavour," "Washington," and "Città di Milano."

At Naples.

Third-class battle-ships—"Marco Polo," "Maria Pia," "Affondatore,' "Castelfidardo."
Third-class cruisers—"Montebello," "Tripoli," "Goito," "Monzambano," "Confienza," "Agordat," "Coatit."
Torpedo-boat destroyers—"Nembo," "Turbine," "Aquilone," "Borea," "Euro," "Ostro."
Torpedo-boats—Nos. 118 to 141.
Second-class special service ship—"Savoia."
Third-class special service ships—"Scilla," "Cariddi."

At Venice.

Second-class cruisers—"Giovanni Bausan," "Vesuvio," "Stromboli."
Third-class cruisers—"Piemonte," "Dogali," "Lombardia," "Liguria," "Elba," "Etruria," "Umbria," "Calabria," "Puglia."
Torpedo-boats—Nos. 76 to 79.
Third-class special service ships—"Cristoforo Colombo," "Staffetta," "Volturno," "Curtatone," "Governolo."

At Tarentum.

Third-class battle-ships—"Arcono," "San Martino."
Third-class cruisers—"Etna," "Fieramosca," "Urania," "Aretusa," "Minerva," "Caprera," "Iride," "Euridice," "Calatafimi," "Partenope."
Torpedo-boats—Nos. 142 to 153.
Second-class special service ship—"Vittorio Emanuele."
Third-class special service ship—"Europa."

New Ships.—Two new torpedo-avisos, the "Agordat" and "Coatit," were launched shortly before Christmas at Castellamare, their dimensions being as follows:—Length, 289 feet; beam, 30 feet 6 inches; draught, 11 feet 1 inch, with a displacement of 1,350 tons. The armament consists of twelve 3-inch and two 1-pounder Q.F. guns, with two torpedo-tubes. The armour deck, running the whole length of the ship, is of 1 inch hardened steel, and there are cofferdams filled with cellulose, which extend round the ship inside above and below the water-line. The engines are triple-expansion, steam being provided from water-tube boilers of the Blechynden type, and are to develop 7,500-I.H.P., giving a speed of 23 knots. The normal coal supply is 160 tons, but 300 tons can be stowed on an emergency.

The first-class armoured cruiser "Varese," which was launched last autumn from the Orlando Yard at Leghorn, has been built to replace a ship of the same name which was sold two years ago to the Argentine Government. The new ship is 16 feet longer, and has a displacement of 560 tons greater than her predecessor, with 500 more I.H.P., and is altogether a more powerful ship, her dimensions being as follows:—Length, 344 feet 6 inches; beam, 59 feet; displacement, 7,400 tons, with a draught of 23 feet 9 inches. Armour protection is afforded by a complete water-line belt of 6-inch nickel steel tapering to 3·5-inches at the extremities, which reaches to 4 feet 9 inches above the water, and 3 feet 3 inches below; above this belt is a central redoubt, rising to the upper-deck, also protected with 6-inch armour, about 175 feet long, in which the secondary battery will be mounted, shut in fore and aft by 5-inch armoured athwartship bulkheads, while the barbettes for the heavy guns are of 6-inch steel, the bases of which are protected by bulkheads with armour of similar thickness; the conning-tower is of 5-inch, and the

armoured deck 1·5-inch, all the armour being of specially prepared nickel-steel. The armament consists of one 25-centimetre (10-inch) gun in fore barbette, two 20-centimetre (8-inch) guns in after barbette, ten 6-inch Q.F. guns in the central battery, four 6-inch Q.F. on the upper-deck protected by shields, six 12-pounder Q.F. guns on upper-deck, four more in central battery, with six 3-pounder Q.F. and several machine guns, and four torpedo-tubes. The engines are to develop 13,500-I.H.P., giving a speed of 20 knots, steam being provided by 24 Belleville boilers, while the total coal supply will be 1,400 tons, giving a radius of action of 9,300 miles at 10-knot speed. The use of wood in the ship has been almost entirely dispensed with, and every modern improvement adding to the efficiency of the ship has been adopted.

The Minister of Marine, Vice-Admiral Bettolo, has laid before Parliament his scheme for the increase of the fleet, and his proposals seem likely to be accepted. It is proposed to expend 24,000,000 lire during the next four years, principally on battle-ships and torpedo-boat destroyers. The number of permanent workmen in the arsenals is not to exceed 12,000, but when necessary extra men are to be taken on temporarily, who, however, will not be entitled to pensions. The Minister of Marine hopes to effect certain important administrative reforms, which will result eventually in economies to the extent of 40,000,000 lire. The Treasury will during the next four years advance this sum to the Minister, which is to be expended in the construction of new ships-of-war and in the hurrying on of the present programme, which it is proposed to complete in four years instead of seven as originally intended.

Commencing with the financial year 1899-1900 and for the three years following the extraordinary annual expenditure, in addition, that is, to the amount included in the ordinary part of the Navy Budget for the building of ships, shall be £400,000. The amount for the building of ships, which is placed annually in the ordinary part of the Navy Budget, shall include an instalment of the sum authorised by the Act of July 28th, 1891, which still remains unallotted, and these instalments shall be fixed for the years 1899-1900 to 1903-4 as follows:—1899-1900, £940,000; 1900-1, £980,000; 1901-2, £976,000; 1902-3, £960,000; 1903-4, £960,000. In the 14 succeeding years the amount of the annual instalment shall be reduced by £120,000.

It is proposed to commission this year the new first-class battle-ship "Ammiraglio di Saint Bon," the new first-class armoured cruisers "Varese" and "Vettor-Pisani," the new torpedo-avisos "Agordat" and "Coatit," with six destroyers and some torpedo-boats. Work on the new battle-ships "Benedetto Brin," and "Regina Margherita," as well as on six cruisers, the plans for which are now ready, is to be actively pushed on.

It is proposed to lay down four new armoured cruisers this year, to be called the "Genova," "Pisa," "Venezia," and "Amalfi"; they are to have a speed of 22 knots and at economical speed to have a radius of action of from 9,000 to 10,000 miles. The armament will consist of eight 20-centimetre (8-inch) guns, eight 15·2-centimetre (6-inch) Q.F. guns, twelve 4·7-centimetre (3-pounder) Q.F. guns, with six torpedo-tubes. Plans for a new small battle-ship of between 7,000 and 8,000 tons, to have a speed of 23 knots, are also under consideration; she will really be, probably, only an armoured cruiser. The Italian Government has invited the Italian builders and Messrs. Armstrong to tender for the vessels on the following terms:—*a*. The ships are to be completed within two years. *b*. The first payment for them will be made in 1902, and continued annually at the rate of 2,000,000 lire (£80,000) for each ship, without interest. It is estimated that the cost of each ship will be about 18,000,000 lire (£720,000), and the payment, therefore, will be spread over about nine years. *c*. 1,000,000 lire (£40,000) additional will be paid per ton decrease in the tonnage below 8,000 tons.

Dockyard Work.—Work is proceeding on both the old battle-ships "Italia" and "Lepanto"; they are receiving water-tube boilers, and as the substitution o

nickel-steel for the old iron armour carries with it a great reduction in weight, it is hoped that both ships will under the new conditions be able to maintain the speed of 18 knots, which they were originally intended to have. The superstructure will be considerably reduced, which will leave room for an increase of the auxiliary armament; electricity will be introduced for doing various work on board, including the loading and working of the heavy guns and the ammunition hoists; and the deck protection will be strengthened. The military mast will be retained, chiefly for purposes of signalling.

The slip from which the "Coatit" was lately launched at Castellamare is to be lengthened so as to allow of ships 400 feet in length being constructed upon it.

Steam Trials.—The new torpedo-aviso "Condore" has finally concluded her trials satisfactorily. During a three hours' run on the measured mile between Genua-Tino, with 300 revolutions, she attained a speed of 26·5 knots, the mean for the whole run being 26 knots, which was a knot in excess of the contract requirements. A sister ship, the "Pellicano," is undergoing her trials, but no more of this type are to be built, destroyers of about 300 tons displacement, of which ten are now under construction, taking their place. Of the ten new vessels, four are being built by the Schichau firm at Elbing, four by a private firm at Naples, and two by the Ansaldo firm at Sestri Ponente.

Armour-plate Trials.—Some experiments were lately carried out at the range at Miggiano with some armour-plates hardened by a new process at the Great Terni Steel Works, which are intended to be used in the protection of the new ships under construction. The plates under trial were 8 feet long by 5 in width, and were 6 inches thick, secured by eight bolts to a backing of 24 inches of oak on a $\frac{3}{8}$ of an inch iron plate. Five shots were fired against each plate from a 6-inch gun, throwing a 100-lb. projectile with an initial velocity of 1,600 foot-seconds. Only two of the projectiles penetrated, and there were no cracks, the projectiles in each case being broken up, the penetration in the one case being 4 inches, and in the second 4·4 inches. As a final test, a Krupp 112-lb. projectile with an initial velocity of 2,500 feet per second was fired; the projectile broke up completely, but the point penetrated the plate and the wood backing, without, however, the plate cracking or showing any fissures.

Last Year's Naval Manœuvres.—The manœuvres which took place during the latter part of October and beginning of November were on a smaller scale than the previous year. The Active Squadron, under the command of Admiral Magnaghi, consisting of the first-class battle-ships "Sicilia," "Sardegna," "Re Umberto," "Dandolo," "Andrea Doria," and the "Ruggierio di Lauria," with the cruisers "Vettor-Pisani," "Caprera," and "Urania," and the Reserve Squadron, under the command of Vice-Admiral Frigerio, consisting of the battle-ships "Lepanto," "Francesco Morosini," and "Maria Pia," with the cruisers "Lombardia," "Calatafimi," and 42 torpedo-boats, formed the opposing fleets. The manœuvres were superintended by Admiral H.R.H. the Duke of Genoa. As the result of the operations which took place off the coast of Gaeta, it is reported that with the exception of the battle-ships of the "Sicilia" class, none of the ships are fit for modern warfare, and that large sums will have to be expended in increasing and modernising the fleet.

All the coast batteries are also to be provided with three mortars, as it is considered that their plunging fire will be of great value against an attack by ships.—*Mittheilungen aus dem Gebiete des Seewesens* and *Italia Marinara.*

JAPAN.—The new first-class battle-ship "Shikishima" last month, having completed her steam and gunnery trials, left this country at the end of last month for Japan. As by some naval experts and critics, she is considered to be a better ship than our "Majestic" class, the following details of the ship and her trials, which we have taken mainly from the *Times*, may prove of interest:—

"On May 1st, 1897, the first plate of the keel of the Japanese war-vessel "Shikishima" was laid, and within twenty-nine months (notwithstanding a six months' delay in the delivery of armour, armament, and engines, due to the engineers' strike) her trials have been satisfactorily completed. On her eight hours' full-speed trial the engines worked well, indicating upwards of 15,000-H.P. on the measured distance, or 500-H.P. beyond the contract with Messrs. Humphrys, and the ship maintained a mean speed of 19·023 knots, at slightly over her load draught of 27 feet 3 inches. She turned a complete circle in 3 minutes 16 seconds, heeling only 5°. The following are the leading dimensions of the vessel: — Length over all, 438 feet; length between perpendiculars, 400 feet; beam (extreme), 75 feet 6 inches; depth, top of keel to upper deck, 45 feet 2½ inches; draught (mean), 27 feet 3 inches; displacement, 14,850 tons. She has a double bottom amidships, with water-tight flats at the ends of the vessel. The armour is of Harveyized nickel steel, and the side protection consists of a belt extending from stem to stern. The belt is 8 feet 2 inches in maximum depth. It is 9 inches thick amidships and tapers to 4 inches thick at the ends. It has a vertical extension of 5 feet 6 inches below the water-line and 2 feet 8 inches above at the designed load draught. Above this belt, and carried to the height of the main deck, there is side armour 6 inches thick for a length of 250 feet, with screen bulkheads at end, also 6 inches thick, forming a complete armour citadel, thus extending longitudinally over the space between the two barbettes. The armoured deck is arranged according to the modern principle as in the ships of the "Canopus" class, its sides being joined to the lower edges of the belt. The two barbettes are circular in plan, are placed with their diameters coincident with the fore and aft centre line. The armour on them has a maximum thickness of 14 inches, and runs to a height of 4 feet above the upper deck. There are eight armoured casemates on the main deck and six on the upper deck, all of 6-inch armour on the outside, and having armour-plating at the deck to protect the guns' crews from explosive shells. The armament consists of four 12-inch breech-loading guns of 40 calibres, two being in each barbette, and fourteen 6-inch Q.F. guns mounted in the casemates. There are also twenty 12-pounder guns, eight 47-millimetre 3-pounder Q.F. guns, and four 47-millimetre 2½-pounder Q.F. guns. There are four submerged discharges for 18-inch torpedoes and one in the stem above the water-line. For defence against torpedoes the usual net arrangement is provided in the design. The electric installation consists of 800 incandescent lamps of 16 candle-power, six 24-inch search-lights of 20,000 candle-power, with masthead, bow, anchor, and coal-bunker lights of 50 candle-power. The compasses, telegraphs, semaphores, and deck instruments are also lighted with incandescent lamps (in addition to the oil lamps), masthead flashing signal, yard-arm reflectors, and search-lights for distant signalling. The vessel has twin-screws, the two sets of propelling engines supplied by Messrs. Humphrys, Tennant & Co. being of the three-stage compound type. The cylinders are 34 inches, 53 inches, and 84 inches in diameter, with a stroke of 48 inches. There are two main condensers, having a cooling surface of 15,500 square feet. There are twenty-five Belleville boilers, having a collective heating surface of 40,000 square feet. The "Shikishima" is fitted as a flag-ship, accommodation being provided for an admiral and 38 officers. The admiral's saloon is in the stern, opening on to the stern gallery. Next to the admiral's quarters are the ward-room and dining-rooms, and beyond are the officers' cabins. These cabins are divided by galvanised corrugated steel, and in fact metal is substituted for wood in all positions where it is admissible. The crew are berthed forward, and there is mess accommodation for the entire ship's company at one sitting. The total complement will be 741 all told.

The gun and torpedo trials were carried out off Portsmouth. The torpedo trials were begun at 8.30. A target was laid out in the Solent, and the ship steamed backwards and forwards past the target, varying her speed. Fifty per

cent. of the shots passed fairly under the centre of the target, and the remainder were but little off it. Although the torpedoes were not fitted for the gyroscopic steering gear, they ran with unusual accuracy. The Elswick submerged tubes perfectly performed all their functions. A torpedo was put into each of them before the ship got under way, no further attendance being required beyond the pressing of an electric key on deck as the sights of the directors came successively on to the target. The automatic return of the guide or shield within the ship also rendered attention to the tubes after firing unnecessary. All the torpedo-tubes are supplied with the Elswick cordite impulse.

The torpedo trials having been thus satisfactorily completed, the "Shikishima" proceeded to the east of the Isle of Wight for her gun trials. Three rounds were fired from each 12-inch gun, at various positions of training and elevating. In the after turret the guns were fired independently, but in the fore turret they were fired simultaneously. It was proved that, with a crew which had never seen the guns two days previous to the trials, an interval of only 45 seconds between rounds was required. The whole of the hydraulic mechanism worked with the greatest ease, and, as the system of mounting the guns in the "Shikishima" is a new one, involving departure from former designs in several important respects, the trial was of great interest. The 12-inch guns of the "Shikishima" are of 40 calibres length of bore. They fire an 850-lb. projectile with a velocity of 2,300 foot-seconds, and with a charge of 145 lbs. of cordite. The mechanism for working the guns is amply provided with alternatives. Thus, if any accident occur to the hydraulic machinery, electric machinery can be brought into use, and should this in turn fail, the whole of the machinery can be worked by hand. The breech mechanism of the guns is so easily worked by hand that it was considered unnecessary to apply hydraulic machinery to it. Firing can be done either by electricity or percussion. The fourteen 6-inch and twenty 12-pounder guns carried by the "Shikishima" were tried in November, two rounds from each 6-inch, and four from each 12-pounder being fired without a hitch of any kind. The 6-inch and smaller guns are well provided with hoists for the supply of ammunition. These can be worked either by electricity or hand. The former system is on an entirely new design, which has given most favourable results. An endless chain, running over a pulley at the top and a winch at the bottom, is made to work very rapidly indeed backwards and forwards; thus, a cartridge or a projectile in a bag is hooked on to the chain at the bottom, the coned friction gear is brought into action, and the ammunition very rapidly hoisted. Then, while it is being unhooked at the top, another round is being hooked on the other side of the chain at the bottom, the machinery is reversed and the second charge hoisted, and so on. The reversing is done by having two cones, one on each side of the driving wheel. If hoisting in one direction, one cone is brought into operation, or if in the other direction the other. A simple cut-off insures the cone's being thrown out of gear at the right time for each lift. If the work is too heavy for the motor a certain amount of slip between the cones will occur; this happens in starting to hoist, but does no harm to the cones and saves the motor from being strained. The whole armament and hydraulic machinery, together with turrets or turntables, and their thick armour were supplied by Sir W. G. Armstrong, Whitworth & Co., Ltd., everything being manufactured at their works except the armour, which was manufactured by Messrs Charles Cammell & Co., Ltd., Sheffield. The ship is going by way of the Suez Canal, and in order to pass through she will be lightened to a draught of 26 feet 6 inches. It is anticipated that she will occupy 80 days on the voyage, as, owing to her having a skeleton crew of 350 men instead of her full complement of 800, it will be necessary to steam at an economical speed.

The torpedo-boat destroyer "Usugumo," being the sixth vessel built and engined by Messrs. John I. Thornycroft & Co. for the Japanese Government, has undergone a satisfactory full-speed trial at the Maplin Sands. The speed

realised when carrying a load of 35 tons was 30·602 knots on the measured mile and 30·370 knots on a run of three hours' duration.

UNITED STATES.—*Steam Trials.*—Unofficial accounts of the trial of the new first-class battle-ship "Kentucky" on the Cape Ann, Mass., course, 24th November, state that she maintained an average speed of 16·878 knots, subject to tidal corrections, for 66 nautical miles. It is estimated that tidal allowance will make her record 17 knots. The trial was made in a somewhat rough sea. It is reported that 45 tons of coal was burned, or about 32 lbs. an hour per square foot of furnace area, under three double-end and three single-end Scotch boilers. The temperature of the engine-room was about 120°. The highest steam pressure developed was 172 lbs. Boilers and machinery worked smoothly for four full hours under forced draught on her return trip to Newport News, Va., the "Kentucky" made the 360-mile run from the South Shoal Lightship off Boston Harbour to Cape Charles in 24 hours and 7 minutes, an average speed of 14·93 knots an hour. During the run, which was under natural draught, she made 44 miles at the rate of 15·3 knots.

The Submarine-boat "Holland."—The "Holland" submarine torpedo-boat lately underwent a successful test over a course between Little Hog Neck and Great Hog Neck, Long Island, in water 20 feet deep. The test was made before the naval members of the Board of Inspection and Survey. The first run was 1 mile under water, submerged to a depth of 10 feet over her deck. The run was made in exactly 9 minutes. On coming to the surface she discharged a torpedo which weighed 840 lbs., 10 seconds later. The torpedo shot past the mark, which was a stake with a flag on it, and came within 25 feet of the stake, although it was discharged nearly 400 feet distant. The torpedo travelled 800 yards.

Under water the "Holland" turned completely round in one and one-half times her own length, which is 54 feet. A second trip was made in which the boat was at times under water, then with deck awash, and again with her upper parts completely out of water. While completely submerged a torpedo was again discharged simply to show that it could be done. Running against a strong ebb tide and a strong wind blowing across her the boat ran, with decks awash, a quarter of a mile at the rate of 8 knots.

The "Holland" was launched from Lewis Nixon's yard, at Elizabethport, N.J., in March, 1896. She is 54 feet long and 10 feet in diameter, and weighs about 11 tons. Her hull is a perfect sphere amidships, the so-called deck being merely a flat superstructure designed to give the crew a foothold as they step from the conning tower. The storage battery, which is thoroughly insulated, is in a compartment amidships, while over this is the conning tower with steering gear, and under it the water tank. The air compressor and gasoline engine for driving the generator are located astern of the battery. Above is the dynamite torpedo-tube. The generator may be either driven by the engine to charge the batteries or thrown on to the batteries, running as a motor while the boat is submerged. The motor generator weighs 2 tons, and is capable of developing 50-H.P. at 800 revolutions, or 150-H.P. at 1,200 revolutions. There are small motors for the pumps, the air compressor, and ventilating apparatus. The "Holland" will be taken to Washington for any further inspection that the Navy Department may desire The trip will be made through the Raritan Canal.

The vessel has now on several occasions been under water for intervals of more than twenty minutes, and demonstrated her ability to respond to a summons to sink beneath the surface, approach a ship, discharge a torpedo, wheel about in her course and return to a place of safety, all within a space of considerably less than half an hour. Tests have been made at depths of about 20 feet, the deepest obtainable in the bay, and the boat has demonstrated to the satisfaction of her builders her ability to remain submerged for a space of 24 hours without the crew of six men and the torpedo operator being subjected to any danger of asphyxiation, or even to inconvenience. Based on the result of the experiments is a claim that the

radius of action under water is 5 miles per hour for almost 6 hours. The speed trial developed a speed of 8 knots.—*Army and Navy Journal* and *Scientific American*.

Report of the Secretary of the Navy.—The following is a *précis* of the annual report of the Secretary of the Navy, which is principally devoted to a presentation of the business of the Department during the year.

New Ships and Repairs.—Since the last annual report the following vessels, which were then building under contract, have been conditionally or finally accepted: Torpedo-boats—"Davis," "Mackenzie," "Farragut," "Rowan," "Fox"; practice-ship "Chesapeake"; Tugs—"Penacook," "Pawtucket"; battle-ship "Kearsarge." In addition, the following vessels, which were sunk during the war with Spain, have been recovered and added to the Navy—"Reina Mercedes," cruiser; "Don Juan de Austria," gun-boat; "Isla de Cuba," gun-boat; "Isla de Luzon," gun-boat. The "Don Juan" and the two "Islas" are repairing at Hong-Kong. The cost of raising and repairing is estimated at $305,000. Seventeen smaller vessels can be added to the Asiatic station through purchase or capture. The "Kearsarge" attained a speed of 16·816 knots on her trial, 25th September, and the "Kentucky" on 24th November. They are the first two vessels completed without premium for excess of speed. Some delay has occurred on vessels under construction through the inability of the contractors to procure armour and other material, and the lack of experience on the part of some of them in building torpedo craft.

According to a table in the report, four battle-ships should be finished early in 1900, and one in October. The three others under construction should be available, one in 1901, and the other two early in 1902. The cruiser "Albany," now building in England, and most of the 33 torpedo craft, should be available during the coming year, and the four monitors in 1901. Work on the design of gun-boat No. 16, to replace the "Michigan" on the Great Lakes, has been suspended awaiting the modifications of the treaty with Great Britain, which are now under consideration.

A table is given showing in detail the cost of each finished ship since the rebuilding of the fleet began in 1883: $101,217,562.10 is the amount appropriated; the actual cost of 74 finished vessels is $98,569,511.85, an average of $1,331,108. The cost of the 62 unfinished vessels is estimated at $62,570,616.23; 42 vessels have been dropped from the Navy during the year.

A further trial of the "Holland" submarine boat was made by the Board of Inspection and Survey on 6th November, 1899, and the Board reports that the requirements were fulfilled. The Department at present has a submarine boat under construction at the Columbian Iron Works at Baltimore, which was reported on 1st November as 85 per cent. completed. It is believed that the results thus far obtained, as above reported, are indicative of the very important possibilities of this type of naval war-vessel.

Personnel.—On 30th June, 1899, the enlisted force of the Navy numbered 4,370 petty officers and 10,131 men and apprentices, a total of 14,501; 3,500 were serving under continuous-service certificates. It is gratifying to note the continued improvement in the enlisted force, and the increase of the percentage of American citizenship. Eighty-eight per cent. of the petty officers are citizens of the United States, and 65 per cent. of the remainder have declared their intention; 75 per cent. of the enlisted men are citizens, and 48 per cent. of the remainder have declared their intention. Of the 2,221 apprentices, over 91 per cent. are native-born. It is from the apprentice system that the Department has hoped to gradually build up the tone of the enlisted force of the Navy, and to finally make it entirely American. The Department has also taken steps during the past year to increase the number of man-of-war's men by enlisting several hundred native-born men, from 21 to 26 years of age, as landsmen, and sending them to sea on board

cruising training-ships. The "Hartford," on the Pacific coast, and the "Lancaster," on the Atlantic coast, have been selected for this purpose, and it is hoped in this way to train a number of men, who, when transferred to regular vessels of war, will be proficient for any service which may be required of them.

Of the engineer officers below the rank of commander, who were given the option of assuming line or retaining engineer duties, but 13 have elected line duties. These have been given a special course of training in ordnance and compass work, and are now performing duties on board ship to qualify them for the line. Those who, by the terms of the act, were to perform line duties, have received such assignment thereto. The demand for engineer officers, the number of whom has been so greatly decreased by this act, has been met in some measure by the appointment of 100 warrant machinists who are competent by their service and experience for a certain class of practical work. It is not certain, however, that they can fully take the place of the highly-trained technical engineer, upon whom must fall the duty of designing, superintending construction, instructing in engineering branches, as well as supervising the motive power of our great ships. The officers of this higher type should, in addition to practical knowledge, be possessed of that thorough theoretical training in steam engineering which comes from full academic education.

The recommendation of the Bureau of Navigation that barracks be substituted for receiving-ships is approved, and the argument for this change presented in the annual report of that Bureau is reported in substance. The United States is the only naval Power of the first class which has not already constructed barracks for housing and training seamen. We should promptly take steps to the same end.

Coaling Facilities.—A detailed account is given of the improvement in coaling facilities. At the outbreak of the war with Spain, the Department found itself greatly hampered by the lack of coaling facilities both at home and abroad. As set forth in the last annual report, this was overcome, in large measure, by the employment of colliers, which kept the fleets in Cuban and Philippine waters well supplied. Our ability to do this, however, was due to the proximity of the North Atlantic fleet to our own shores and to the early destruction of the Spanish fleet in the Philippines, which left our colliers free to come and go without fear of interception by the enemy. A further appropriation of $400,000 was made at the last session of Congress for coal depôts, and it is the intention of the Department to carry out the recommendations of the Coal Board and provide facilities for storing and handling coal at the Navy yards at Portsmouth, Boston, New York, League Island, Pensacola, and at the Naval Station, Port Royal, S.C. The conditions existing at the outbreak of the war with Spain in this respect have been much improved in the waters of the West Indies and in the Pacific Ocean, where the Government of the United States has recently acquired extensive possessions. The Department has taken steps to provide in these new possessions such facilities as the means at its command permits for the storage of coal and for the establishment of naval stations, with the necessary plants for making ordinary repairs to vessels of war.

Ordnance, etc.—The number of guns authorised for the main batteries of vessels has increased since the last report by 281, the total now being 1,071. Work on gun construction, gun mounts, turret fittings, and ordnance supplies has progressed favourably, and the armament for all vessels authorised will be ready by the time it is required. Extensive improvements have been made at the Naval Gun Factory and its facilities considerably increased. It is essential, however, that it be still further extended; and the purchase of more land, and the erection of additional shops, is desirable. Owing to the number of vessels added to the Navy by purchase and capture, which it has been necessary to furnish with batteries, the number of reserve guns available for auxiliary cruisers has been reduced. An item of $250,000, therefore, has been included in the estimates for the manufacture

of an additional supply. The general performance of guns, mounts, and munitions of war throughout the naval service has been excellent.

Manufacturers have made commendable progress with smokeless powder and are turning out a satisfactory product in considerable quantities. It is proposed to supply all new ships, and the powder for the "Kearsarge," "Kentucky," and "Alabama" is now ready for them. The older vessels will also be supplied as rapidly as possible. The Government powder factory at Indian Head is progressing favourably and will be completed in a few months. Unavoidable delays in obtaining materials have retarded its progress to some extent and it is preferable to do good rather than hasty work. It is neither expected nor desired to enter into competition at these works with private manufacturers, except as to quality, it being the policy of the Department to foster the commercial industry, upon which the country must largely draw its supply.

There is a diversity of opinion among officers as to the extent to which electricity should be used on shipboard, but the Department hopes during the coming year, when the "Kearsarge" and "Kentucky" will be in commission, that their experience will enable it to form a better opinion as to its value under conditions of actual service. The extent to which electricity is employed on these new ships has led the Department to establish a school of instruction in electricity and the care and use of electrical appliances on shipboard, at the naval torpedo station, Newport, R.I., for officers, and at the Navy yards at New York and Boston, for enlisted men. It is contemplated to establish in the near future a similar school at the Mare Island Navy Yard.

Improvements of an important character have been made in naval magazines. No suitable site for one at New York has yet been obtained owing to the opposition of property owners. A calibre for small arms uniform with that of the Army has been adopted.

Dockyards and Docks.—In contracting for dry docks the Department has followed the requirements of Congress as to materials, but the experience of the Department in contracting for the masonry docks has shown that they can be built of the most substantial character, with the best equipment and within a reasonable period of time at a cost very little in excess of the wooden structures. Coupled with this record of moderate cost for permanent and safe docks of the largest size is the unfortunate experience the Department has had with practically all the timber dry docks it has constructed. In those cases in which there has been no alarming accident or failure the cost of repairs and renewals has been very great. In view of these facts the Department strongly recommends that authority be given to modify the contracts for the timber docks and build them of concrete and stone. The total value of the real estate and chattels and machine plants at the Navy yards and stations on 30th June, 1899, was $64,144,066·16. The largest investment is represented at the New York and Boston yards, where the value of the real estate and chattels reaches a total of $19,165,000 and $12,295,000 respectively. The cost of maintenance of these yards and stations for the fiscal year ending 30th June, 1899, was $7,436,438·36. During the fiscal year ending 30th June, 1899, improvements were made to the real estate and chattels at these yards at a total expenditure of $1,935,594·11, and to the machinery plants at a total cost of $1,196,703·76.

The yards are not adequately equipped and liberal appropriations for their improvement are asked in addition to those already expended on the rehabilitation of the yards and plants. A brief synopsis is given of the work in progress and completed at the yards during the year. Estimates have therefore been submitted to provide adequate facilities for protection from fire at the Navy yards at Portsmouth, Boston, New York, League Island, and Washington. Also for the construction of marine railways at Portsmouth, New York, League Island, Norfolk, Port Royal, and Mare Island, in order that torpedo-boats and small vessels, the number of which is constantly increasing, may be taken out of the

water with facility, at small expense, and without recourse to the large dry docks needed for the use of the larger vessels. $1,500,000 is asked to erect barracks to replace receiving ships. Attention is called to the request of the Bureaus of Construction and Steam Engineering for appropriations to improve their plants.

Naval Construction at Home and Abroad.—The following tables show the tonnage laid down in 1899, and the total tonnage now under construction by the principal naval Powers :—

Laid down in 1899.	Battle-ships.	Cruisers.	Torpedo-vessels.	Total.
	Tons.	Tons.	Tons.	Tons.
England	116,000	127,700	4,200	247,900
France	25,456	113,943	4,800	144,199
Germany	44,324	2,800	4,200	51,324
Italy	32,000	—	1,800	33,800
Japan[1]	—	—	—	—
Russia	57,426	6,375	1,700	65,501
United States	36,970	(2)	4,191	54,101
Monitors	12,940	—	—	

[1] All vessels called for by Japan's first building programme are either completed or under way. It is rumoured, however, that the following will be laid down in 1899 :—1 cruiser, third-class ; 2 torpedo gun-boats ; 12 torpedo-boats, first-class ; 16 torpedo-boats.

[2] In November, 1899, bids were received for 6 protected cruisers of 3,200 tons.

Total now under construction.	Battle-ships.	Cruisers.	Torpedo-vessels.	Total.
	Tons.	Tons.	Tons	Tons.
England	251,700	267,080	12,900	531,680
France	80,281	166,283	8,969	255,533
Germany	99,729	41,851	6,655	148,235
Italy	78,454	38,901	3,185	120,540
Japan	59,700	63,280	7,133	130,113
Russia	115,713	92,697	16,566	222,976
United States	94,715	4,935	10,646	123,236
Monitors	12,940	—	—	

From this it appears that only Italy and Japan laid down less tonnage than this country during the year 1899, and that Italy alone has less tonnage under construction.

Increase of the Navy.—The number of large, swift, and powerful armoured cruisers of great coal endurance in our Navy is largely disproportionate to the rest of the naval establishment. The experience of the year 1898 has also shown the need of several smaller vessels usually classed as gun-boats. It is therefore recommended that Congress be requested to authorise the construction of the following vessels :—

1. Three armoured cruisers, of about 13,000 tons trial displacement, of a maximum draught at deep load not to exceed 26 feet, carrying the heaviest armour and most powerful ordnance for vessels of their class, to be sheathed and coppered, and to have the highest practicable speed and great radius of action.
2. Twelve gun-boats, of about 900 tons trial displacement, to be sheathed and coppered ; and

3. As recommended a year ago, three protected cruisers of about 8,000 tons trial displacement, carrying the most powerful ordnance for vessels of their class, to be sheathed and coppered, and to have the highest practicable speed and great radius of action.

The increase in the tonnage of the last three named vessels from 6,000 tons, as recommended a year ago, to 8,000 tons is suggested by the Naval Board of Construction as better adapted to the present needs of the Service. The same Board are also of the opinion that if any of the foregoing vessels are authorised, the law should provide that in case satisfactory bids cannot be obtained for their construction by contract, the Department shall have authority to construct the same in the Navy yards.

Consolidation of Bureaus.—In the opinion of the Department it would be in the interest of good business organisation and economy to consolidate the three Bureaus of Construction and Repair, Steam Engineering, and Equipment under one head. These bureaus have to do with the construction and fitting out of a vessel—in one word, the material of a ship. It is an integral work. When a contract is made for the construction of a ship, it is made with one builder. It is not given part to a constructor of hulls, part to a steam-engine manufacturer, and part to an outfitting firm. Whatever various trades enter into the work are all under one head. This is the method of private shipyards which build the largest ships, and which are not left to the administration of three heads between whom delicate questions of respective authority and responsibility are liable to arise, resulting in delays, and too often in friction and lack of harmony of co-operation.

Each of the above Bureaus has now, during the construction of naval vessels, its separate inspectors at each yard. A consolidated bureau could, of course, be run much cheaper than three bureaus, and a great saving made by a reduction of the now three separate working forces, both clerical and mechanical, especially in our Navy yards. Fewer naval officers would be needed, as there would be but one staff instead of three, so that more officers would be available for other duty. Under the present system one bureau brings its work to the point of readiness for the work of another, which is not always ready for it. There is necessarily a lack of that adaptation and harmony of movement which one head would secure.

If this consolidation were effected, the matter of furnishing coal and other current supplies, which is now under the direction of the Bureau of Equipment, could easily be transferred to the Bureau of Supplies and Accounts, and such other incidental changes made as became necessary.

The foregoing suggestion is made solely with a view to an improvement in departmental organisation, and with the highest appreciation of the ability and dutifulness with which these Bureaus have been administered under their present heads. Efficient as they have been, however, their consolidation is recommended, because it is believed that if consolidated under the direction of any one of their present heads, or of any competent officer, that efficiency would be still greater, less expense incurred, and a better business organisation would succeed.

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS FOR JANUARY, 1900.

Brevet Colonel F. S. Allen from Lieut.-Colonel h.p. to be Colonel to command the 15th Regimental District (the East Yorkshire Regiment). Brevet Colonel J. H. H. S. D. Hogarth from Lieut.-Colonel h.p. to be Colonel to command the 17th Regimental District (the Leicestershire Regiment) during the absence in South Africa of Colonel (local Major-General) E. R. P Woodgate, C.B., C.M.G. Lieut.-Colonel J. W. Hind from h.p. to be a D.A.A.G. Lieut.-Colonel J. Reeves, Princess Victoria's (Royal Irish Fusiliers), to be Colonel. Major-General E. R. P. Woodgate, C.B., C.M.G., to be a Knight Commander of the Order of St. Michael and St. George. Major and Brevet Lieut.-Colonel G. G. Cunningham, D.S.O., the Sherwood Foresters (Derbyshire Regiment), to be Colonel. Brigadier-General F. J. D. Lugard, C.B., D.S.O., to be High Commissioner for the Protectorate of Northern Nigeria. Sir R. D. R. Moor, K.C.M.G., to be High Commissioner for the Protectorate of Southern Nigeria. Field-Marshal H.R.H. Albert Edward, Prince of Wales, K.G., etc., to be Hon. Colonel of the Corps of Imperial Yeomanry. Brevet Colonel L. F. Brown from Lieut.-Colonel h.p. R.E. to be a Colonel on the Staff for Royal Engineers and to have the substantive rank of Colonel in the Army. Lieut.-General Sir W. Stirling, K.C.B., R.A., to be Lieutenant of the Tower of London. Lieut.-Colonel C. H. B. Norcott, the Rifle Brigade (Prince Consort's Own), to be Colonel. Lieut.-General Sir W. Stirling, K.C.B., to be Colonel Commandant Royal Regiment of Artillery. General H.R.H. the Duke of Connaught, K.G., K.T., K.P., G.C.B., etc., to be a General on the Staff to command the Forces in Ireland. Major-General B. A. Combe, C.B., to be a First-Class District Commander in India. Colonel A. G. Wavell to be a Major-General on the Staff to command the 15th Brigade, Field Force, South Africa, and to have the local rank of Major-General in South Africa whilst so employed, vice Colonel (Local Major-General) J. E. H. Prior, deceased. Brevet Colonel W. Aitken, C.B., A.D.C., to be a Colonel on the Staff for Royal Artillery, and to have the substantive rank of Colonel in the Army. Colonel R. L. H. Curteis from h.p. to be a D.A.G. Brevet Colonel C. E. Swaine, C.B., from Lieut.-Colonel h.p. to be an A.A.G. and to have the substantive rank of Colonel in the Army. Lieut.-Colonel F. E. Kitson, Staff Paymaster, to be Chief Paymaster, with the substantive rank of Colonel in the Army. Lieut.-Colonel S. H. Winter, A.S.C., to be Colonel. Lieut.-Colonel and Hon. Colonel Viscount Valentia, Oxfordshire Yeomanry Cavalry, to be A.A.G. for the Imperial Yeomanry, with the temporary rank of Colonel in the Army. Lieut.-Colonel and Brevet Colonel R. C. B. Lawrence, Professor Staff College, to be a D.A.A.G. Lieut.-Colonel and Hon. Colonel C. C. W. Lord Chesham, Buckinghamshire Yeomanry Cavalry, is granted the temporary rank of Colonel in the Army with the Imperial Yeomanry. Brevet Colonel G. P. F. Byng from Lieut.-Colonel h.p. to be Colonel to command the 51st (the King's Own Yorkshire Light Infantry)

and 65th (the York and Lancaster Regiment) Regimental Districts. Lieut.-Colonel J. Willcocks, C.M.G., D.S.O., is granted the local rank of Colonel whilst Commandant of the West African Frontier Force. The under-mentioned Lieut.-Colonels to be Colonels :—E. Balfe, I.S.C. ; A. de V. Alexander, I.S.C. ; W. L. Davidson, R.A. ; O. V. Boddy, R.E.

The under-mentioned appointments are made to the Staff on mobilisation of the 8th Division :—Major-General Sir H. M. L. Rundle, K.C.B., C.M.G., D.S.O., Royal Artillery, to be a Lieut.-General on the Staff to Command the Division, with the temporary rank of Lieut.-General whilst so employed. Colonel G. E. Harley, C.B., to be A.A.G. Lieut.-Colonel R. H. Morrison from h.p. to be Provost-Marshal. Lieut.-Colonel W. A. May, R.A.M.C., to be P.M.O. Major-General B. B. D. Campbell, M.V.O., to be Major-General on the Staff to Command the 16th Brigade. Major-General J. E. Boyes to be Major-General on the Staff to Command the 17th Brigade.

The under-mentioned temporary appointments are made :—Brevet Colonel A. E. Duthy, from Lieut.-Colonel h.p. R.A., to be a Colonel on the Staff for Royal Artillery, and to have the substantive rank of Colonel in the Army. Lieut.-Colonel and Brevet Colonel W. S. Clarke from h.p. to be an A.A.G., and to have the substantive rank of Colonel in the Army. Lieut.-Colonel and Brevet Colonel W. A. Collings from h.p. to be an A.A.G., and to have the substantive rank of Colonel in the Army. Lieut.-Colonel the Hon. J. P. Napier from h.p. to be an A.A.G., and to have the substantive rank of Colonel in the Army. Lieut.-Colonel F. C. Ricardo from h.p. to be an A.A.G. Colonel Sir C. S. B. Parsons, K.C.M.G., to be a Colonel on the Staff for Royal Artillery in South Africa. Colonel H. E. Penton, I.S.C., from an A.Q.M.G. in India, to be a Colonel on the Staff in India. Lieut.-Colonel and Brevet Colonel L. R. H. D. Campbell, I.S.C., to be a Colonel on the Staff in India, and to have the substantive rank of Colonel in the Army. Lieut.-Colonel and Brevet Colonel V. A. Schalch, I.S.C., to be an A.Q.M.G. in India, and to have the substantive rank of Colonel in the Army. Colonel W. F. Kelly, C.B., specially employed in South Africa, to be Major-General. Lieut.-Colonel and Brevet Colonel F. A. Yorke, Assistant-Commandant R.M. Academy, to be a Colonel on the Staff for Royal Artillery, and to have the substantive rank of Colonel in the Army.

City of London Imperial Volunteers :—Colonel W. H. Mackinnon to be a Colonel on the Staff as Colonel Commandant.

Mounted Infantry.—Lieut.-Colonel Commandant and Hon. Colonel H. C. Cholmondeley, 1st London Volunteer Rifle Corps, to be Lieut.-Colonel, with the temporary rank of Lieut.-Colonel in the Army.

Infantry.—Lieut.-Colonel and Hon. Colonel A.A.C., Earl of Albemarle, 12th Middlesex Volunteer Rifle Corps, to be Lieut.-Colonel, with the temporary rank of Lieut.-Colonel in the Army.

HOME.—A special Army Order, issued from the War Office under date 13th January, states that the following instructions are promulgated to the Army with the approval of the Secretary of State for War :—

The conditions under which the services of members of the Royal Engineers (Volunteers) will be accepted for duty in South Africa are as follows :—

1. A carefully selected section of 1 officer and 25 non-commissioned officers and men may be raised from each Volunteer Engineer Corps (Fortress).

Two such sections may be raised from the 2nd Cheshire (Railway) Royal Engineers (Volunteers).

The sections will be attached to units of Royal Engineers serving in, or about to proceed to, South Africa, and will be placed under the officers commanding the several units, or will constitute a reserve at the disposal of the General Officer commanding in South Africa, as shown in the following detail (which is liable to modification according to circumstances) :—

Detail of Allotment of Sections of Volunteer Engineer Corps, South Africa.

Volunteer Corps from which sections are raised.	Allotment.
1st Middlesex	7th (Field) Company, R.E.
1st Lanarkshire	9th ,, ,,
1st Lancashire	11th ,, ,,
1st Newcastle-on-Tyne	12th ,, ,,
1st Yorkshire (West Riding)	17th ,, ,,
1st Gloucestershire	23rd ,, ,,
2nd Tower Hamlets...	26th ,, ,,
1st Hampshire	37th ,, ,,
1st London	38th ,, ,,
2nd Lancashire	6th (Fortress) Company, R.E.
2nd Yorkshire	20th ,, ,,
2nd Gloucestershire	29th ,, ,,
1st Cheshire	31st ,, ,,
1st Devonshire and Somersetshire ...	42nd ,, ,,
1st Flintshire	47th ,, ,,
2nd Cheshire (Railways), two sections	8th (Railway) Company, R.E.
	10th ,, ,,
1st Northamptonshire	Reserve for disposal on arrival in South Africa
1st Durham	,, ,, ,,
1st Aberdeenshire	,, ,, ,,
1st Sussex	,, ,, ,,

2. The strength of each section will be 1 subaltern, 1 sergeant, 1 corporal, 1 second corporal, 22 sappers (including 1 lance-corporal)—total, 26 officer, non-commissioned officers and men.

The detail of trades of the sappers of each section should be as nearly as possible: From Volunteer corps other than the 2nd Cheshire—Carpenters, joiners, wheelwrights, sawyers, cabinet-makers, 9; bricklayers, masons, stonecutters, 8; blacksmiths, fitters, 4—21; and officer's servant, 1—total, 22. From 2nd Cheshire—Engine-drivers, engine fitters, platelayers, boiler-makers, blacksmiths, carpenters, firemen, 21; add officer's servant, 1—total, 22.

3. The selection of officers and the composition of the sections will be controlled by the Sub-district Commanding Royal Engineer.

No Volunteer battalion will be allowed to contribute less than one complete section.

4. The following will be the qualifications for service:—

a. Every Volunteer must enlist for 1 year, or for the war. In the event of the war being over in less than 1 year he will have the option of being discharged at once or of completing his 1 year's service.

b. He must not be less than 20 nor more than 35 years of age.

c. He must have been returned as efficient during 1898 and 1899.

d. He must be of good character.

e. He must be up to the physical standard of a Royal Engineer (dismounted) recruit as laid down in the Recruiting Regulations for the Army. No relaxation of standard will be allowed.

f. He must be medically fit for active service.

g. Preference should be given to unmarried men, or widowers without children. Married men should be accepted only in the event of an insufficient number of single men or widowers without children volunteering.

h. Each sapper must be a skilled tradesman.

5. The Sub-district Commanding Royal Engineer will arrange for testing the men at their trades.

6. When a Volunteer commanding officer has received application from not less than a section of selected Volunteers, he will so inform the Sub-district Commanding Royal Engineer, who will arrange with the officer commanding the nearest regimental district for them to be medically inspected, and, if fit for service in South Africa, attested.

7. After attestation they will be sent to join the Royal Engineers at Chatham under arrangements to be made locally. In the event of there not being sufficient barrack accommodation at Chatham they may be billeted.

8. The general officer commanding will arrange for all Volunteers to receive, after enlistment, such instruction in musketry and field works as circumstances may permit prior to embarkation.

9. Non-commissioned officers and men should be clothed under regimental arrangements in accordance with the special scale for dismounted Reservists of Royal Engineers for South Africa, but the scarlet frock or tunic, and the trousers at present in possession of the men may be used for wear on board ship in place of the cloth frock and tweed trousers taken by soldiers of the Regular forces. The Volunteer pattern greatcoat, field cap, and mess-tin may be retained for wear, but must be in a thoroughly serviceable condition. The titles on the shoulder-straps of the khaki and drab serge clothing will be as laid down in the Volunteer regulations. The foregoing will apply generally to officers. The equipment should be the same as that of Regular soldiers of the same arm of the Service.

The sum of £9 will be granted to the corps for each Volunteer as a special capitation allowance for clothing and equipment.

10. Each officer must be prepared to perform mounted duties. He will be allowed a sum of £10 for the supply of horse equipment and stable necessaries.

If he brings his own horse he will be allowed a further sum of £40 if the horse is accepted. The horses must be passed by a veterinary-surgeon as workably sound, and must be approved by the Sub-district Commanding Royal Engineer. Preference should, as a rule, be given to small horses. All horses will be subjected to a veterinary examination 24 hours before embarkation to prevent the spread of infectious diseases. If he does not provide his own horse, and has to perform mounted duties, he will be provided with a horse in South Africa if practicable.

11. Each Volunteer will receive, from date of enlistment, pay, Engineer pay, rations, and allowances, including messing allowance, of his rank as a Regular soldier of the Royal Engineers. Should a married man be accepted, his family will be entitled to separation allowance from the date of enlistment. This will be paid by Army money order by the district paymaster, Chatham. The officer commanding the regimental district at which the men are attested will furnish the paymaster with the necessary particulars on Army Form D 418, and will immediately inform him of any subsequent casualties.

The rating of non-commissioned officers and men for Engineer pay will be regulated by the provisions of the Royal Warrant for pay and promotion, 1899.

12. On completing his period of service each Volunteer will receive a gratuity of £5, in addition to any gratuity given to the troops at the end of the war.

If discharged in consequence of wounds, injuries, or disability received or contracted while on service, he will be entitled to pension in accordance with the Royal Warrants for Pay, etc., of the Regular Army.

13. On the departure of a section from the United Kingdom the officer and Volunteers composing it will be considered supernumerary to their corps.

14. Service in one of these sections will entitle an officer or Volunteer to be considered efficient for the year, and the corps will receive capitation grant accordingly for each Volunteer actually enlisted.

WOLSELEY, F.-M., Commander-in-Chief.

The *Engineer* denies that the English field guns are inferior to those of the Continental Powers, and institutes this comparison of the elements of power in English and foreign new type field guns:—

Nation.	Calibre of bore in inches.	Weight of projectiles, lbs.	Muzzle velocity, ft.-sec.	Muzzle energy, ft.-tons.	Weight of load behind team, cwt.	Range sighted up to, in yards.
Germany	3·03	15	1525	241·8	33	5468
France	2 95	—	†	†	†	—
Russia	3·42	15·2	1355	193·5	—	—
Austria	3·07	13·2	1800	‡	‡	—
England	3·00	14·6	1574	241·4	32¾	5500
Horse Artillery.						
England	3·00	12·5	1553	—	31	5200
Field Howitzer.						
England	5·00	50	782	—	—	4990*

* At 42° 24′ elevation. † At present kept secret. ‡ Experimental.

The *Engineer* further says:—"The fact is that the reports of battle are at present too vague to enable us to assert that we were 'out-ranged' by the Boer guns; at the same time this is very possible, because they may have brought guns of position into action. The Boers had the advantage of occupying the ground deliberately before we came up; the regular purpose of guns of position is to defend ground thus prepared and entrenched, but we had to bring up our forces quickly, and with them came our field guns proper. We admit that this, while it vindicates the character of our field guns, as field guns, does not account for our having no guns of position following them. The naval guns were a sort of substitute for guns of position; that is to say, they were heavier pieces, weighing 12 cwt., as compared with 7 cwt. for our field battery, and 6 cwt. for our horse artillery.

"Their velocity and energy are much higher, but we do not yet know what they effected. We have before discussed the question of their mobility. On the whole, we think there is no ground furnished for objecting to the design of the field gun, as we have before said, fitted with the Clarke brake; we believe that it would hold its own against any field gun extant or likely at present to come in. The selection and supply of guns and ammunition is another matter. We are certainly inclined to believe that howitzers and guns of position ought to have gone out to the war sooner. The 5-inch howitzer shown in the table is a valuable piece, and those with Lord Methuen have proved themselves such, being the pieces that discharged shells filled with lyddite, two of which were reported to have struck between fifty and seventy men each. It will be seen in the table that foreign guns have common shells containing high explosives, as well as shrapnel in their equipment, and we think that we ought to have had the same, though it should be understood that the comparatively high velocity and consequent flat trajectory of the field gun proper would prevent the common shell from searching behind corners and striking men in the way the cross fire of the howitzer enables it to do."

As to lyddite, the *Engineer* says:—"It is practically identical with melinite, both consisting of picric acid run in with a little other matter, which is itself nearly the same in the two explosives. The Boers are reported to have used melinite about Ladysmith. They were not successful at first in bursting it. Our arrange-

ments for that purpose are very effective, but are confidential. Doubtless the Boers will before long succeed in bursting their shells also, but in the meantime we hardly suppose that even the advocates of the Boer will contend that, having charged his shells with melinite, his humanity caused him to employ inefficient means of ignition."

Lyddite is simply picric acid brought into a dense state of fusion. The shells are coated inside with a special varnish, and the melted picric acid is cast into them. As this requires a strong detonator, or a very powerful primer, the Government is said to have adopted a primer of picric powder, which consists of a mixture of two parts of ammonium picric to three parts of saltpetre, manufactured in much the same way as ordinary granulated gunpowder. This is then set off by the ordinary service fuse. Melinite was originally picric acid, embedded in a collodion solution, and later on also fused picric acid. A mixture of fused picric acid and cresylic picric acid is now employed. Although picric acid was used as an explosive in the pulverulent state, mixed with saltpetre and other ingredients, yet the property of detonating with great violence when melted, was first indicated by Dr. Herman Sprengal, and afterwards patented by Eugène Turpin, of Paris.—*U.S. Army and Naval Journal.*

Die Vedette, in a recent number, publishes the following interesting statistics of the military strength of various countries: —

Country.	Armed Strength.	Percentage of Military to Population.
Russia (exclusive of Cossacks)	4,000,000	33
Germany	3,750,000	68
France	3,500,000	88
Austria-Hungary	2,100,000	45
Italy	1,300,000	40
Great Britain (about)	500,000	9
Turkey	750,000	31
Spain	500,000	26
Portugal	120,000	24
Servia...	161,000	55
Roumania	250,000	55
Bulgaria	209,000	55
Greece	159,000	55
Sweden	250,000	38
Norway	38,000	
Denmark (about)	110,000	44
Belgium (about)	200,000	30
Netherlands	69,000	14
Switzerland	230,000	74
United States	150,000	2
Japan	300,000	7

TRANSVAAL.——Sir William MacCormack, the President of the Royal College of Surgeons, who volunteered his services for the South African war, sends an interesting account to the *Lancet* of his first experiences with wounds inflicted by the Mauser bullet. The cases he reports are from the Wynberg Hospital, near Cape Town. He says:—

"I saw a large number of injuries inflicted by the Mauser bullet, which is remarkable for the small external wound it produces. In three-fourths, if not even a larger proportion, it was impossible to tell the exit from the entrance wound, they were so similar in appearance. One man, a Gordon Highlander, had his elbow smashed up into small pieces. He believed it was an explosive bullet, but it may have been a Mauser at short range, for he was hit at a distance of 300 yards.

The Boers, however, use other weapons. A Martini-Henry bullet was removed from the ball of a man's thumb yesterday—an almost solitary example of a lodged bullet. They also fire hollow bullets which would have explosive effects. In the wards I noticed quite a number of perforating chest wounds and some remarkable perforations of bone without any solution of continuity or complete fracture; in one instance there was a perforation of the shaft of the tibia at the junction of the upper with the middle third of the bone, an injury which my previous experience would pronounce quite impossible.

"There were several cases in which the bullet had entered the groin and emerged through the central portion of the buttock, the direction taken making it difficult to conceive how the femoral vessels, the sciatic nerve and artery, the femur and other important parts had escaped all injury. There were four abdominal injuries. In two severe hæmaturia followed and the direction of the wound suggested injury to the bladder. In another the bullet entered the buttock and emerged in front of a little below the ribs. In a third instance the abdomen was traversed in a similar direction. There were hæmatemesis and bloody stools for three days without any further symptoms. In another case the bullet apparently traversed the abdomen from the right linea semilunaris in front at a point a little above the level of the umbilicus to emerge 2 inches to the right of the lumbar spine. There were no symptons in this case of any kind."

Sir William also gives a brief account of seventeen interesting cases he saw during a visit to the hospital at Wynberg. Wounds healed with great rapidity, little apparent injury resulting from perforations in all parts of the body.

FRANCE.—The Autumn Manœuvres for 1900 will be organised and regulated in conformity with the regulations of the General Instructions of the 18th February, 1895. The nature and the duration of the manœuvres are decided upon as follows:—

I.—ARMY MANŒUVRES

will be executed under the chief supervision of General Jamont, Vice-President of the Superior Council for War:—

By the 4th and 10th Army Corps, under the command of General Brugère, the Military Governor of Paris;

By the 5th and 9th Army Corps, under the command of General Lucas, commanding the 9th Army Corps. During these manœuvres the 1st Cavalry Division will be attached to the army formed by the 4th and 10th Army Corps; the 5th Cavalry Division to the army composed of the 5th and 9th Army Corps.

II.—DIVISION AND BRIGADE MANŒUVRES.

The other army corps will execute division and brigade manœuvres under the conditions specified under heading III. of the instructions of the 18th February, 1895, viz.:—

Division Manœuvres.—The 1st, 2nd, 3rd, 7th, 13th, 14th, and 15th Army Corps, for 15 days; the 20th Army Corps for 10 days, inclusive of going and returning.

Brigade Manœuvres.—The 8th, 11th, 12th, 16th, 17th, and 18th Army Corps for 14 days, inclusive of going and returning.

III.—CAVALRY MANŒUVRES.

Brigade Field Movements.—The 6th, 7th, 8th, 11th, 12th, 13th, 14th, 15th, and 20th Brigades, as well as the brigades of the 2nd, 3rd, 4th, 6th, and 7th Divisions will execute brigade field movements for a period of 8 days, exclusive of going and returning.

Division Manœuvres will be executed by the 1st, 2nd, and 3rd Brigades, and by the 16th, 17th, and 18th Brigades, under the supervision respectively of the Inspectors-General of the 1st and 6th Cavalry Districts.

Participation in the Autumn Manœuvres will be taken in addition by :—

1. All corps brigades.
2. By the 1st and 5th Cavalry Divisions under the conditions mentioned above.

SPECIAL DISPOSITIONS.

The 4th Battalions of the 9th, 10th, and 12th Corps, stationed in Paris, and those of the 6th, 7th, and 20th Corps quartered in fortified places or in frontier forts, will not take part in the manœuvres. All the remaining 4th Battalions will proceed with their regiment. It is strictly forbidden, in all army corps executing division and brigade manœuvres, to change the nature of the manœuvres laid down for each unit, or to assemble numbers superior to those of which that unit is composed.

On no account must horses of less than 7 years be taken to any manœuvres whatever. Cuirassier regiments should not furnish any escort except to the President of the Republic.

These regiments should also never be called upon to provide a mount, during the manœuvres, to officers not belonging to the corps.

The organisation of the manœuvres in the Alps and the Vosges, as well as in Algeria and Tunis, will be made the subject of special instructions. Staff rides of army corps and manœuvres with cadres will be executed in 1900 under the following conditions :—

I.—STAFF RIDES.

A staff ride will be executed in each army corps, and in the Paris military district.

In the 14th and 15th Districts special staff rides will take place, which will be regulated by instructions to be issued later.

II.—MANŒUVRES WITH CADRES.

A. *Infantry Divisions.*

The Army Corps of the Interior.—Two manœuvres with cadres of the Active Division and one manœuvre with cadres of the Reserve Division will take place in each army corps, with the exception of the 6th and 7th.

In each of the 6th and 7th Army Corps there will be three manœuvres with cadres of the Active Division, and one with those of the Reserve Division. The Brigade at Lyons will execute a manœuvre with brigade cadres.

Generals commanding army corps who may wish to organise a manœuvre with army corps cadres will furnish a report of their intention by the 15th March next, at latest.

Algeria and Tunis.—Three brigade manœuvres with cadres will be executed by the 19th Army Corps, and one brigade manœuvre with cadres by the Tunis Occupation Division.

B. *Cavalry Divisions.*

The seven cavalry divisions, and the six permanent inspection districts for Cavalry, will each execute a manœuvre with division cadres.—*Revue du Cercle Militaire.*

GERMANY.—The military budget has allowed for a series of measures and innovations in the military organisation.

First may be mentioned the additional increase about to be given to the School of Gunnery at Juterbog on account of the new field pieces and the new organisation of the field artillery. In the place of a colonel, a brigadier-general will command there, and in place of two instruction groups there will be three under the command of a superior officer to be called "the commandant of the instruction regiment of the Field Artillery School." In addition to these 3 groups of 3 batteries each, 11 new field batteries of the lower effective, and 8 of the

medium effective will be raised, by which the organisation of the field artillery will be completed, making a total of 22 batteries to be formed.

Three squadrons of mounted Jägers will also be raised. The 38th Division of the 11th Army Corps, hitherto unprovided with cavalry, will now have 2 squadrons of mounted Jägers under the command of a major. The question of transport for ammunition, raised by the re-organistion of the field artillery, leads to the formation demanded for means of transport for mountain warfare. Horses are specially trained to serve as beasts of burden; and for this purpose 4 Jäger battalions will each receive in peace-time 8 animals destined for this service. The first will be given to the Jäger brigade of the 14th Army Corps at Colmar. At the same time 4 non-commissioned officers and 32 men of the military train will be formed to look after these animals. The increase made to the War Academy at Berlin will necessitate the appointment of new professors for military sciences. Gradually officers of the headquarter staff will be relieved from professorial duties as lecturers at the Academy. The numerical insufficiency of the medical corps, which, all the same, has 800 more members than the French, also calls for notice.

The Kaiser Wilhelm Academy, which trains the medical candidates, not being able to provide a sufficient number, recourse will be had, even more than formerly, to civil medical practitioners by persuading them to enter the active military service. A premium of from 300 to 2,500 marks will be offered them as compensation for the value of their medical studies. A credit of 36,000 marks will be first demanded on this account. These are very modest figures when one considers the high price paid for medical education, a great influx of civil medical practitioners into the Army cannot therefore be looked for. The hoped-for results will, doubtless, not be obtained unless officers of the Army Medical Department are first given the same rank and the same material advantages as other officers of the Army. The special budget of the Saxon Army allows for the formation, from the 1st April next, of a new infantry regiment of 2 battalions, obtained by utilising 1 existing Jäger battalion, and by lowering the effectives of 2 other Jäger battalions and 11 infantry regiments.

Finally, the effective total of the German Army for the financial year 1900 consists of 23,844 officers, 80,556 non-commissioned officers, 491,136 men, 2,165 military doctors, 1,044 paymasters, 671 veterinary-surgeons, 1,001 armourers, 93 saddlers, and 101,929 horses. It is hoped that the Reichstag will vote the amount demanded without sensible modifications.

After having identified field artillery with the division, it has been deemed necessary by the Emperor to give uniformity to the command with regard to the employment of artillery fire. With his unquestioned power, Wilhelm II. has not hesitated to cause his divisional commanders to recommence from the beginning, in order to demonstrate to them the conditions that should everywhere regulate the employment of batteries. Two gunnery courses, of 15 days each, have been organised, one in January and one in February. Commanders of division, and one brigadier per army corps take part in them. The reason given for the formation of these gunnery courses is the necessity for instructing general officers coming from the infantry or from the cavalry in the method of field battery fire.

The necessity for the development of general instruction of all the chiefs of the Army has caused the Emperor to decide that generals, coming originally from the cavalry and artillery, and who hold infantry commands, must go through a special musketry course at the Infantry School of Musketry. The new Field Service Regulations, printed at the end of the year, are now in the hands of all officers. Especially remarkable is the increase in initiative it permits to commanders of all ranks, and, above all, the precaution taken every moment to so regulate things that during peace-time these commanders will be constantly obliged to make decisions on their own responsibility.

It is asserted that the war at present taking place in West Africa has exercised a certain influence on portions of the field service regulation, especially on those

parts which concern fire tactics and skirmishers. The importance of musketry has been recognised by the Emperor for a long time, as may be easily seen from the encouragement musketry instruction has received in the Army since his accession. Not only has he striven to arm the German Army with the best possible weapons, such as rifles and guns, but he has given a very great impetus to field firing for small detachments as well as for large bodies of troops.

The chief essential of all exercises is not the number of rounds fired, but the number of shots which take effect.—*Le Progrès Militaire.*

The *Danziger Zeitung* states that this year's Army Manœuvres in Germany, in which the Guard Corps and the 2nd Army Corps will be opposed, will have a special interest. They will include the shipment and landing of a large body of troops, consisting of a brigade of infantry, a regiment of field artillery, and a regiment of cavalry. These troops will be taken on board transports, and as there are as yet no transports belonging to the German Navy the vessels of the North-German Lloyd will be used. The German fleet will co-operate ; it will accompany the transports, and the fire of its big guns will cover the landing of the troops. The chief difficulty is to find a place on the German coast where these operations can be carried out, for although the infantry and a detachment from the ships' crews could be landed almost anywhere on the coast, the cavalry and artillery would require smooth water for the landing of horses and guns either by means of barges or direct on to the wharf.

Senate Document No. 29 contains a letter from the Secretary of War transmitting a report of Dr. John McG. Woodbury, giving a detailed description of the medical service of the German Army, from which we learn these facts.

The medical service is directly under the medical division of the War Ministry, and is presided over by the Surgeon-General, who is a lieut.-general. The Medical Corps consists of military doctors with assimilated grades of commissioned officers (*sanitäts-offizier-korps*), military doctors graded as non-commissioned officers (*sanitäts-unteroffiziers*), nurses, sick bearers, and hospital attendants.

Each division has a divisional surgeon, with the rank of colonel. Each infantry or railway regiment, a regimental surgeon with the rank of major or captain, and two battalion surgeons with the rank of captain. Each cavalry and artillery regiment has one regimental surgeon with the rank of major or captain, and most regiments have also one to two surgeons, with the rank of lieutenant. There is a section surgeon with the rank of captain for artillery regiments. Each foot artillery regiment or independent battalion has one surgeon with the rank of captain ; some have also one surgeon with the rank of lieutenant. Many train battalions have each one surgeon with the rank of lieutenant. Besides the troop surgeons, there are various surgeons detailed to garrisons, to hygieno-chemical research stations, and to hygieno-chemical laboratories at certain corps head-quarters. The principal sanitary depôt is in Berlin.

A diagram shows the disposition of the wounded from battle-field to final destination. Severely wounded, non-transportable are treated at permanent field hospitals ; transportable are sent to *étape* hospitals, hence by auxiliary hospitals with hospital trains they are sent home, to reserve private hospitals or to Red Cross hospitals. Slightly wounded remain with troops or are sent direct to assembly points and marched to *étape* hospitals. Wounded on the field of battle are treated by medicine wagon detachments, which are battalion units and first dressing stations ; or by sanitary companies, division units of two platoons each, as principal dressing stations.

Sinks are always placed in separate house from either sleeping or eating quarters of the men. They are arranged so as to give ample accommodation for each battalion. The commissioned officer is responsible for their sanitary condition, but they are kept clean and in order by civilian *employés*, who are paid to act as scavengers.

Sinks in bivouac are trenches dug 4 feet deep, 3 feet wide at the top, and 2 feet at the bottom, over which is erected a rail resting on crossed stakes at either end; each man after usage being required to cover his movement with earth.

Disinfectants are only used in hospitals, not in barracks.

All regulations regarding light, air, clothing, bedding, water, bathing facilities originated in the staff department in Berlin, and are carried out by the captains of the companies. There is a saying of a company, "The captain is the father and the first sergeant is the mother." This will explain that the Line officer looks after his men and sees to their personal cleanliness.

Water is not boiled and it is not filtered, but all water before use at any barrack is carefully analysed by the medical officer, and when troops are to be quartered in a town the water of that town is examined before the troops are sent there. There are no disinfectant arrangements for sinks, except cleanliness and discipline. They are never in disorder. In barracks all garbage, grease, whatever scrap may come from ration, are carefully collected in large covered barrels and sold, the purchaser removing the same twice a day. In the field all refuse about a bivouac is carefully collected and burned.

The feet of the Army are most carefully considered, each man's feet being inspected by one of the company officers, a medical officer, and the *lazareth-helfer* at least twice a week in barracks, and oftener in active field manœuvres.

At the same time each man's socks or *fuss-lappen* and boots are carefully inspected as to the condition of cleanliness. As the infantry regiments average in marching a kilometre in 10 minutes, or $3\frac{3}{4}$ miles an hour, being often pressed to a kilometre in from $7\frac{1}{2}$ to 8 minutes, each man carrying 60 lbs., this care of feet is most necessary.

The entire body of every man is inspected every thirty days by a company officer and a medical officer, careful search being made for any heart lesions, hernia, venereal disorders, skin diseases, eczemas, etc. This is in order that any physical defect may be carefully noted, cared for, and reported that might be concealed by clothing or in the improper modesty or wilfulness of the enlisted men.

In bivouac the arrangement differs materially from our own. The German soldier and officer being provided only with a shelter tent, each man carries his own cover. The formation is by companies, by regiments, by brigades, much as our own. Ground is never occupied more than any consecutive twenty-four hours by any body of troops, fresh ground or bivouac always being found.—*U. S. Army and Navy Journal.*

ITALY.—The consolidated War Budget (1st July, 1900—30th June, 1901) amounts, as in preceding years, to 239 million lire, not including the expenses necessary for the African troops or for military pensions.

If one deducts from these 239 millions, says the *Italia Militare e Marina*, the expenses for the maintenance of the Royal Carabiniers (gendarmerie), about 29,482,800 lire, those of the national target practice, the exhibition scholarships at military schools and the expenses of other departments defrayed by the War Office, amounting altogether to about 5,066,814 lire, it is evident that there only remain 204,450,386 lire at the disposal of the Minister of War for the various arms and branches of the Service. This sum is divided as follows:—

	Lire.
Administration	1,888,900
Staffs and inspecting officers	4,328,200
Infantry	91,829,800
Cavalry	28,570,600
Artillery (rank and file)	30,380,400
Engineers (rank and file)	7,211,740
Artillery and engineer services	13,340,200
Military schools	2,681,200
Other *personnel* and services	8,189,346
Extraordinary expenses	17,030,000
Total	204,450,386

And from this total the extraordinary expenditure must also be deducted, the details of which, with regard to armament, fortifications, mobilisation, stores, etc., are clearly laid down. There remain, then, only 188,420,386 lire, with which it is proposed to maintain a medium effective of 12,944 officers, 188,749 non-commissioned officers and men, 3,759 civilian officials, 7,684 officers' chargers, and 33,842 troop horses.

If the budget effective is compared with the actual effective, a difference of at least 413 officers, 50,751 non-commissioned officers and men, 114 civilian officials, 306 officers' chargers, and 2,265 troop horses, will be found.

It is laid down that only 135,000 men will be under arms between the 15th September and the 1st March, whilst there will be 240,000 men from the 1st March to the 15th September (exclusive of 25,000 of the Royal Carabiniers). 89,000 men on furlough will be called up for instruction for periods of about twenty days.—*Revue du Cercle Militaire.*

ROUMANIA.—A Royal decree of the 6th September last introduces a new regulation for military inspections of corps and departments, which, in Roumania, consist of ordinary, periodic, and general inspections.

Ordinary Inspections.—These inspections are called ordinary which the various commanding officers have the power of making during the course of the year, either with or without notice, in order to ascertain the state of the troops, their progress in instruction, and the manner in which they carry out their duties. These inspections are not made the subject of a report except in exceptional cases.

Periodic Inspections.—In addition to these ordinary inspections, brigade and division commanders hold annually periodic inspections with special regard to the theoretic and practical instruction of the troops under their orders. Brigade commanders have their inspection after the conclusion of the winter, the spring, and the summer periods of instruction, in the months of March, June, and September, respectively; the division commanders have theirs after the conclusion of the winter and spring periods of instruction. Establishment and departments presided over by division commanders are only inspected once yearly, in April.

General Inspections.—These inspections are universal throughout the Service. They take place in the autumn, that is to say at the time of concentration for the yearly manœuvres. They are held by army corps commanders, the commander of the Dobrogea independent division, the Governor of Bucharest, and the commandant of the fortified district of Focsani-Galatz. Each inspects the troops of his own respective command.

There are, in addition, technical inspections for certain branches of the Service and of departments, which are held by :—

1. The chief of the General Staff, who inspects the Staff cadre, the Military Geographical Institution, and the Army instruction establishments, with the exception of the Cavalry School, the Military School for Artillery and Engineers, and the Cadets' School; this last is inspected by the army corps commander.

2. The Directors-General of Cavalry, Artillery, and Engineers inspect the troops and establishments of those arms. The Military Schools for Artillery and Engineers are inspected alternately by the Inspectors-General of Artillery and of Engineers.

3. The Commissary-General and the Chief of the Army Medical Department carry out the inspections of their respective departments.

4. The Directors-General of the Veterinary and of the Medical Departments may be entrusted, by the Minister for War, with inspections regarding their own specialities.

The technical inspectors carry out their inspections before those of the army corps commanders. They forward to the latter a copy of the report sent by them to the Minister for War.

Inspectors-General may be accompanied, during their inspections, by a superior officer of their staff, by a chief inspector of Army Establishments, as well as by his aide-de-camp. Technical inspectors have the power to take with them an officer attached to the War Department, as well as their aide-de-camp.—*Bulletin de la Presse et de la Bibliographie Militaires.*

RUSSIA.—According to the *Rousskii Invalid*, the making up of the men's clothing, which in Russia is done in units, meets with difficulties in execution because the work it necessitates interferes with the regular service. For instance, an infantry regiment which only receives the material itself from the stores, employs the following staff per company for making up the men's clothes, viz., 1 cutter, 1 machinist, and 6 tailors, that is to say a total of 128 men. It takes 120 days' work, of 6 to 7 hours a day, to make up the clothing, or, at the rate of 20 days' work a month, 6 months. For the making of boots each company employs 4 shoemakers, making a total of 64 men per regiment, and the work takes from 10 to 15 weeks. Other kinds of workmen are, besides, employed regimentally, such as bakers, butchers, cooks, etc., which must necessarily be prejudicial to the regular military service.

In accordance with an order issued by the commander-in-chief of the troops in South Russia, Adjutant-General Count Moussin Poushkin, the commanders of the 7th and 8th Army Corps, quartered in this district, have taken in hand the task of organising a series of trial tests of the working of the new regulations with regard to the carrying out of winter manœuvres in the field. Special attention will be directed by these commanders to the degree of adaptability of the projected exercises to the special climatic conditions of the localities in which they are conducted by the two corps, and the real worth of such winter operations will be determined by practical demonstration. All chiefs of sections are to act carefully on the instructions enjoining them to use their best efforts and judgment to solve this problem of winter military work, and the commanders themselves will be expected to offer suggestions for the guidance of their subalterns and to establish courses of practical exercises for the carrying out of their suggestions. These experiments are now being made for the first time in the Russian Army. The chief of the Elizavetgrad Cavalry Training School, Colonel Samson, has, according to the *Novosti*, been invited to assist in the labours of a special commission which has been appointed by the Minister of War with the object of devising a scheme for the transformation of the existing military schools into establishments whose curriculum shall be a considerable modification of the one now in vogue. The proposed innovation would provide for the completion of the military youths' training in three classes covering as many years. Lieut.-General Harbut, member of the military training-school committee at St. Petersburg, and a general staff

officer will preside over the commission. It is proposed *inter alia* that the studies of the first class shall be confined exclusively to subjects included in the ordinary school courses—to those, for example, of the sixth form of the ordinary Russian provincial school—while the course of the two succeeding years would provide for a thorough instruction in the military arts on the lines of the present military schools. In the second place, it is proposed to give all volunteers of the second category, who under the present order of things are denied admission to the military schools before having served a full year in the ranks, the right to admission without this qualification of previous service on the strength. The commission will formulate its views on a third proposal, which recommends the admission to the first class of all those who have satisfactorily completed the five classes of the ordinary grammar, professional, and other schools, and have successfully passed the examination tests of these establishments. Finally, pupils, on completion of the three-class course under the proposed new *régime*, will be raised to officer's rank at once without the intermediate rank of ensign. It is intended to introduce the new system during the period 1900-03.—*Times*.

The following figures show the difference in the Russian Military Expenditure in the years 1900 and 1899 :—

	Roubles.	
	1900.	1899.
Central Administration	2,591,801	2,527,237
Local Administration...	9,064,623	8,991,396
Schools and Technical Instruction	9,043,353	9,480,725
Hospital and Medical Instruction	4,358,563	4,205,891
Clothing and Equipment	26,402,036	24,644,833
Provisions	45,621,560	47,290,272
Forage	18,251,521	18,561,586
Pay and Wages	71,006,763	67,700,610
Rent and Repair of Buildings	20,853,021	19,968,876
Expenditure for Buildings	24,635,895	25,716,913
Preparation and Completion of Artillery ...	7,877,331	9,133,754
Maintenance of Artillery with Troops and in Fortresses, as well as for Manœuvres ..	2,889,632	2,980,271
Transport, Carriage, Orderlies, etc.	11,192,261	11,498,571
Expenditure for Recruits before joining	1,290,000	1,351,676
Manœuvres of Reserve and Landwehr	3.810,492	2,959,460
Military Administration of Turkestan	1,276,523	1,244,171
Military Police Separation Allowances	3,696,887	3,658,620
Gratuities and Assistance	3,734,860	3,649,684
Allowances, Interest, and Contributions for Establishment for deserving Pensioners ...	5,270,099	4,913.866
Extraordinary Expenditure	616,127	635,897
Expenditure for Kwantung Isthmus	5,000,000	5,000,000
Army Re-armament	24,220.773	19,220,773
Various Expenses	3.205,704	2,233,691
Reserve Credit	9,838,861	12,538,247
Expenditure on account of following years ...	8,595,000	8,595,000
Total	324. 43,686	318 691,539

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SERVIA.—The following statistics about the Servian officers are taken from the Royal Servian Army List for 1899 :—

Members of Combatant Officers on the Active List.

Branch of Service	Generals	Colonels	Lieut.-Colonels	Majors	Captains		1st Lieutenants	Lieutenants	Ensigns	Total
					1st Class	2nd Class				
General officers ...	9	—	—	—	—	—	—	—	—	9
General Staff	—	5	2	7	5	1	—	—	—	20
Infantry	—	12	12	30	156	115	143	200	16	684
Cavalry...	—	4	1	7	24	14	11	27	4	92
Artillery	—	7	8	5	64	30	67	77	—	258
Engineers	—	5	3	7	9	5	17	20	—	66
Total	9	33	26	56	258	165	238	324	20	1,129

Numbers of Non-combatant Officers on the Active List and Military Officials.—Employed at the arsenal, 15; military doctors, 44; doctors on contract, 2; military apothecaries, 10; apothecaries on contract, 7; veterinary-surgeons, 15; veterinary-surgeons on contract, 5; assistant veterinary-surgeons, 25; judge-advocates, 20; gendarmerie officers, 28; administration officials, 154; clerks 1st to 4th Class, 122; professors and technologists, 14; bandmasters, 6; making a total of 467.

Numbers of Pensioned Officers.—At present there are only 98 pensioned officers, ranking from general to captain, 2nd Class, who have the right to wear uniform.

Education.—14 officers were brought up at the War Academy in the 1st annual course and 17 in the 2nd. In the preparatory school at Nisch there are at present 119 youths in their first, 89 in their second, and 78 in their third annual course.

In 1899 the following were ordered to foreign countries to complete their education, viz:—

Russia:—1 captain and 2 first lieutenants of engineers, 1 infantry captain, 2 artillery first lieutenants, 1 from the infantry, 1 from the cavalry, 1 captain judge-advocate, 1 medical student, 1 veterinary-surgeon, 1 engineer.

Austria:—1 captain and 2 first lieutenants of artillery, 2 military surgeons, 14 medical students, 3 apothecaries, 6 veterinary-surgeons.

Germany:—2 veterinary-surgeons, 1 musician.

France:—1 captain of artillery, 1 judge-advocate, 1 military surgeon, 2 veterinary-surgeons.

England:—1 first lieutenant of engineers.

AGE OF COMBATANT OFFICERS.

Generals	between	61	and 49 years.
Colonels	,,	58	,, 43 ,,
Lieut.-Colonels	,,	60	,, 39 ,,
Majors	,,	47	,, 31 ,,
Captains, 1st Class	,,	55	,, 29 ,,
,, 2nd ,, ...	,,	52	,, 56 ,,
First Lieutenants	,,	50	,, 24 ,,
Lieutenants	,,	35	,, 21 ,,
Ensigns	,,	35	,, 27 ,,

The Servian Corps of Officers which numbered 920 combatant officers on the active list in 1891 has since increased more than 20 per cent. Its education and its moral tone have also improved to a remarkable extent.—*Militär W chenblatt.*

SWITZERLAND.—The autumn manœuvres of 1900 will take place from the 8th to the 20th September, and will commence in the Wyl-Zurich district. The 3rd Army Corps will take part in the whole of the operations, and one division made up of troops of all arms from the 4th Army Corps, only during the 17th and 18th September.

On the other hand, siege manœuvres will be executed in the month of September at St. Gothard by the greater portion of the units destined, in the event of mobilisation, for the defence of that place. These last manœuvres should be of very great interest, on account of the effectives which will participate in them.—*Revue du Cercle Militaire.*

NAVAL AND MILITARY CALENDAR.

JANUARY, 1900.

1st (M.) Successful action by General French at Colesberg.
,, ,, Successful action by Colonel Pilcher at Douglas.
,, ,, Kuruman surrendered to the Boers.
2nd (T.) Loyal inhabitants of Douglas safely escorted to Belmont.
3rd (W.) Engagement at Molteno, Northern Border.
,, ,, Drafts Royal Artillery
,, 3rd Grenadier Guards
,, 1st Bn. Coldstream Guards
,, 2nd Bn. Coldstream Guards
,, 1st Bn. Scots Guards
,, 2nd Bn. Royal Lancaster Regiment
,, 2nd Bn. Royal Fusiliers
,, 1st Bn. Yorkshire Regiment
,, 2nd Bn. East Surrey Regiment
,, 2nd Bn. Dorsetshire Regiment
,, 1st Bn. South Lancashire Regiment
,, 2nd Bn. Royal Highlanders (Black Watch)
,, 2nd Bn. Middlesex Regiment
,, 3rd Bn. King's Royal Rifles
,, 1st Bn York and Lancaster Regiment
,, 1st Highland L I.
,, 2nd Bn. Seaforth Highlanders
,, 1st Bn. Rifle Brigade
No. 5 General Hospital
A.S.C. and A.P.D.
} Left England for South Africa in the "Kildonan Castle."

,, ,, No. 7 Company Royal Malta Artillery left Malta for Egypt in the "Anubis."
4th (Th.) H.M.S. "Polyphemus" paid off at Chatham.
,, ,, An Army Order was issued for the embodiment of 16 more Militia units.
,, ,, The Boers retired from Molteno.
,, ,, 3rd Bn. Royal West Kent Regiment (Militia) left England for Malta in the "Golconda."
,, ,, 2nd Bn. Norfolk Regiment
,, ,, 2nd Bn. Hampshire Regiment
Detachment No. 7 Company R.A.M.C. (Bearer Company)
} Left England for South Africa in the "Assaye."

4th (Th.) 14th Brigade Staff
2nd Bn. Lincolnshire Regiment
Regimental Staff R.E., 7th Division
No. 9 Field Company R.E.
2nd Cavalry Brigade Field Hospital
} Left England for South in the "Goorkha."

,, ,, 1st Bn. King's Own Scottish Borderers
No. 12 Company A.S.C.
No. 17 Company A.S.C.
No. 7 Company R.A.M.C. (Bearer Company)
} Left England for South Africa in the "Braemar Castle."

5th (F.) One Squadron 16th Lancers left India for South Africa in "Landula."
,, ,, ,, ,, ,, ,, ,, ,, "Fazilka."
,, ,, ,, ,, ,, ,, ,, ,, "Nairung."

6th (Sat.) Boer assault on Ladysmith repulsed. British casualties about 420. Boer losses very heavy.

,, ,, Three Companies 1st Bn. Suffolk Regiment made an unsuccessful attack on a Boer position near Rensberg, Northern Border. British casualties 44 killed and wounded, 107 captured.

,, ,, 12th Brigade Staff
1st Bn. Royal Irish Regiment
2nd Bn. Wiltshire Regiment
Detachment No. 4 Company R.A.M.C. (Field Hospital)
} Arrived at Cape Town from England in the "Gascon."

7th (S.) No. 7 Company Royal Malta Artillery arrived at Alexandria from Malta in the "Anubis."

,, ,, 15th Brigade Staff
2nd Bn. Cheshire Regiment
No. 19 Company R.A.M.C. (Bearer Company)
5th Division Field Hospital
} Left England for South Africa in the "Britannic."

8th (M.) Ammunition Column 7th Division
Detachment 4th Division Field Hospital
} Left England for South Africa in the "Glengyl."

,, ,, Hospital-ship "Princess of Wales" arrived at Cape Town from England.

,, ,, Draft 1st Bn. Royal Scots
,, Devonshire Regiment
,, 1st Bn. Royal Inniskilling Fusiliers
,, 2nd Bn. Duke of Cornwall's Light Infantry
,, 1st Bn. Welsh Regiment
,, 1st Bn. Gordon Highlanders
,, 2nd Bn. Royal Irish Rifles
,, 1st Bn. Connaught Rangers
,, 1st Bn. Argyll and Sutherland Highlanders
Detachment R.E. Regimental Staff, 6th Division
Detachment No. 5 General Hospital
} Arrived at Cape Town from England in the "Avoca."

8th (M.) R.E. Regimental Staff, 6th Division
38th (Field) Company R.E.
2nd Bn. Worcestershire Regiment
No. 10 Company A.S.C.
No. 23 Company A.S.C.
No. 8 Company R.A.M.C. (Bearer Company)
No. 4 Company R.A.M.C. (Field Hospital)
} Arrived at Cape Town from England in the "Tintagel Castle."

,, ,, "A" Battery R.H.A.
Mounted Infantry Remounts (269)
} Left India for South Africa in the "Muttra."

9th (T.) British Troops invaded Free States territory near Jacobsdal.

,, ,, Boer Government refuse to permit the United States Consul at Pretoria to represent British interests in the Transvaal.

10th (W.) "J" Battery R.H.A., left India for South Africa in the "Ujina."

11th (Th.) Sir Redvers Buller seized Potgieter's Drift on the Tugela, Lord Dundonald and mounted brigade crossed to north bank of Tugela by the Drift.

,, ,, 6th Bn. Royal Warwick Regiment (Militia)
4th Bn. Derbyshire Regiment (Militia)
3rd Bn. Durham L.I. (Militia)
Detachment No. 20 Company R.A.M.C. (Bearer Company)
} Left England for South Africa in the "Umbria."

12th (F.) 3rd Bn. Royal West Kent Regiment (Militia) arrived at Malta from England in the "Umbria."

13th (Sat.) H.M.S. "Amphion" arrived at Plymouth from Pacific.

,, ,, 1st Bn. East Lancashire Regiment
2nd Bn. South Wales Borderers
4th Division Field Hospital
} Left England for South Africa in the "Bavarian."

,, ,, 4th Bn. Royal Lancaster Regiment (Militia)
9th Bn. King's Royal Rifles (Militia)
Detachment No. 20 Company R.A.M.C. (Field Hospital)
} Left England for South Africa in the "Nile."

,, ,, The City of London Imperial Volunteers (258 officers and men) left England for South Africa in the "Garth Castle."

,, ,, 15th Brigade Staff and City of London Imperial Volunteers (265 officers and men) left England for South Africa in the "Briton."

14th (S.) H.M.S. "Nymphe" arrived at Portsmouth from Mediterranean.

,, ,, 13th Brigade Staff
2nd Bn. East Kent Regiment
1st Bn. Oxfordshire L.I.
No. 7 Company R.A.M.C. (B.C.)
} Arrived at Cape Town from England in the "Gaika."

,, ,, 2nd Bn. North Staffordshire Regiment
14th Division Field Hospital
} Left England for South Africa in the "Aurania."

15th (M.) H.M.S. "Pique" commissioned at Devonport for China.

,, ,, British camp established at Zoutpansdrift in Free State territory.

,, ,, Royal Proclamation issued prohibiting the export from the United Kingdom of articles used in the manufacture of high explosives.

,, ,, The Boers attacked General French at Colesberg and were repulsed.

,, ,, Draft 12th Lancers
Remounts Cavalry
,, Mounted Infantry
} Left England for South Africa in the "Persia."

16th (T.) Launch of Torpedo-boat Destroyer "Asugumo" at Chiswick for Japanese Government.

" " 6th Bengal Infantry attacked and dispersed rebellious Mundas in Chota Nagpur, India.

" " General Lyttelton's Brigade crossed the Tugela at Potgieter's Drift.

17th (W.) H.M.S. "Pandora" floated out at Portsmouth.

" " Martial Law proclaimed in the Hopetown and Philipstown districts of Cape Colony.

" " Sir Charles Warren's Division crossed the Tugela at Trichard's Drift to the west of Potgieter's Drift.

" " New South Wales and Queensland portions of the second Australian contingents left Sydney for South Africa on the "Southern Cross" and the "Surrey."

18th (Th.) Fighting near Acton Homes between Lord Dundonald's Mounted Brigade and the Boers. Boers defeated, losing 35 men.

" " Osman Digna was captured in the neighbourhood of Tokah, near Suakin.

" " Brigade Division Staff R.F.A. 7th Division
83rd, 84th, and 85th Batts. R.F.A.
Detachment 5th Division Field Hospital
} Left England for South Africa in the "Manchester Port."

" " No. 2 Company S.D., R.G.A.
No. 5 Company E.D., R.G.A.
3rd Bn. South Lancashire Regiment (Militia)
4th Bn. Argyll and Sutherland Highlanders (Militia)
Detachment No. 5 Company R.A.M.C. (Bearer Company)
} Left Ireland for South Africa in the "City of Rome."

" " Detachment 6th Infantry Division Staff
No. 16 Company S.D., R.G.A.
Draft 2nd Bn. Northumberland Fusiliers
" 2nd Bn. West Yorkshire Regiment
" 2nd Bn. Shropshire L.I.
" 1st Bn. Royal Dubin Fusiliers
Detachment No. 5 General Hospital Details
} Arrived at Cape Town from England in the "Jelunga."

19th (F.) H.M.S. "Sparrow" paid off at Sheerness.

" " H.M.S. "Europa" left Portsmouth for Malta with relielf crew for "Ramillies."

" " An Army Order was issued for the mobilisation of an 8th Division for service in South Africa.

" " Colonel Plumer, with three armoured trains, reached Gaberones on his march to the relief of Mafeking.

20th (Sat.) Sir Charles Warren's Division moved towards Spion Kop.

" " The 2nd New Zealand contingent (242 officers and men and 300 horses) left Wellington for South Africa in the "Waiwera."

" " A portion of the 2nd Canadian contingent (2 batteries) left Halifax for South Africa in the "Laurentian."

" " The American Hospital-ship "Maine" arrived at Cape Town from England.

" " No. 3 Hospital Train (Princess Christian's)
Detachment No. 6 General Hospital
Staff Imperial Yeomanry
City of London Imperial Volunteers (105)
} Left England for South Africa on the "Kinfauns Castle."

20th	(Sat.)	City of London Imperial Volunteers (467) left England for South Africa in the "Ariosto."	
,,	,,	City of London Imperial Volunteers (218) left England for South Africa in the "Gaul."	
,,	,,	A Reserve Battery and Remounts left India for South Africa in the "Purnea."	
,,	,,	1st Bn. West Riding Regiment Draft R.A. ,, 1st Bn. Essex Regiment No. 6 Company R.A.M.C. (Field Hospital)	Arrived at Cape Town from England in the "Orient."
,,	,,	Draft Royal Artillery ,, 3rd Bn. Grenadier Guards ,, 1st Bn. Coldstream Guards ,, 2nd Bn. Coldstream Guards ,, 1st Bn. Scots Guards ,, 2nd Bn. Royal Lancaster Regiment ,, 2nd Bn. Royal Fusiliers ,, 1st Bn. Yorkshire Regiment ,, 2nd Bn. East Surrey Regiment ,, 2nd Bn. Dorsetshire Regiment ,, 1st Bn. South Lancashire Regiment ,, 2nd Bn. Royal Highlanders (Black Watch) ,, 2nd Bn. Middlesex Regiment ,, 3rd Bn. King's Royal Rifles ,, 1st Bn. York and Lancaster Regiment ,, 1st Bn. Highland L.I. ,, 2nd Bn. Seaforth Highlanders ,, 1st Bn. Rifle Brigade No. 5 General Hospital A.S.C. and A.P.D.	Arrived at Cape Town from England in the "Kildonan Castle."
,,	,,	Boer shell factory at Johannesburg destroyed by an explosion.	
21st	(S.)	13th Brigade Division R.F.A. 2nd and 44th Batt. R.F.A. Ammunition Column Draft R.E. Detachment 1st Bn. King's Own Scottish Borderers Detachment No. 5 Stationary Hospital	Left England for South Africa in the "St. Andrew."[1]
,,	,,	One Squadron 16th Lancers arrived at Durban from India in the "Fazilka."	
,,	,,	Brigade Division Staff R.F.A, 6th Division 76th, 81st, and 82nd Batts. R.F.A. 2nd Bn. Gloucestershire Regiment Draft 2nd Bn. Scottish Rifles No. 18 Company R.A.M.C. (Field Hospital)	Arrived at Cape Town from India in the "Cymric."

[1] This transport left on the 21st January, 1900, and not on the 30th December, 1899, as stated in the December Calendar of the JOURNAL for January.

23rd (T.) 14th Brigade Division R.F.A. (Staff)
39th and 88th Batt. R.F.A.
Ammunition Column
Detachment No. 6 General Hospital
} Left England for South Africa in the "Ulstermore."

" " 13th Brigade Division R.F.A. (Staff)
8th Batt. R.F.A.
Detachment Ammunition Column
14th Brigade Division R.F.A.
68th Batt. R.F.A.
Draft 1st Bn. Liverpool Regiment
" 1st Bn. Leicestershire Regiment
" 2nd Bn. Yorkshire L.I.
" 2nd Bn. Wiltshire Regiment
Remounts
No. 6 General Hospital
A.P.C.
} Left England for South Africa in the "American."

" " One Squadron 16th Lancers arrived at Durban from India in the "Lardula."

" " One Squadron 16th Lancers arrived at Durban from India in the "Nairung."

" " 2nd Bn. Norfolk Regiment
2nd Bn. Hampshire Regiment
Detachment No. 7 Company R.A.M.C. (Bearer Company)
} Arrived at Cape Town from England in the "Assaye."

" " Sir Charles Warren captured Spion Kop.

" " Boer advance on Chieveley frustrated by General Barton's Brigade.

" " Orders issued at Cape Town for the raising of two additional Squadrons of South African Light Horse, to be known as "Roberts's Horse" and "Kitchener's Horse."

24th (W.) Mounted Infantry Company 2nd Bn. West Riding Regiment

" " Mounted Infantry Company 2nd Bn. Essex Regiment

" " Mounted Infantry Company 2nd Bn. Durham L.I.
} Left India for South Africa in the "Palamcotta."

25th (Th.) Spion Kop abandoned by the British.

" " "T" Batt. R.H.A.
"G" Batt. R.H.A.
Draft 2nd Bn. Royal Irish Fusiliers
Detachment No. 5 General Hospital
} Arrived at Cape Town from England in the "Manchester Corporation."

" " 14th Brigade Staff
2nd Bn. Linc. Regiment
Regt. Staff R.E., 7th Division
No. 9 Field Company R.E.
2nd Cavalry Brigade (Field Hospital)
} Arrived at Cape Town from England in the "Goorkha."

26th (F.) 5 Companies Imperial Yeomanry (2 Companies Bucks, 1 Company Berks, 1 Company Oxford, and 1 Company Middlesex Yeomanry) were inspected by H.R.H. the Prince of Wales in Regent's Park.

" " "J" Battery R.H.A. arrived at Durban from India in the "Ujina."

27th (Sat.) H.M.S. "Latona" arrived at Portsmouth from Bermuda with relieved crew of "Indefatigable."

" " Sir Charles Warren's force withdrew to the south of the Tugela. British casualties in the five days' operations amounted to about 1,650. The Boer losses were also heavy.

27th	(Sat.)	15th Brigade Division R.F.A. Staff 5th, 9th, and 17th Batts. R.F.A. Ammunition Column Detachment No. 6 General Hospital	Left Ireland for South Africa in the "Manhattan."
,,	,,	12th Brigade Staff R.F.A. (Howitzer) 87th Batt. R.F.A. Remounts No. 5 Stationary Hospital Details	Left England for South Africa in the "Canning."
,,	,,	12th Brigade Division R.F.A. (Howitzer) Staff 43rd and 86th Batts. R.F.A. Draft 2nd Bn. Northampton. Regiment Detachment No 5 Stationary Hospital	Left England for South Africa in the "Englishman."
,,	,,	No. 6 Company Staffordshire Yeomanry No. 8 Company Derbyshire Yeomanry Hospital Staff Veterinary Staff	Left England for South Africa in the "Cavour."
,,	,,	15th Brigade Staff 2nd Bn. Cheshire Regiment No. 19 Company R.A.M.C. (Bearer Company) 5th Division Field Hospital	Arrived at Cape Town from England in the "Britannic."
,,	,,	"A" Battery R.H.A. Mounted Infantry Remounts (269)	Arrived at Cape Town from from India in the "Muttra."
28th	(S.)	No. 9 Company Yorkshire Hussars (Yeomanry) No. 10 Company Sherwood Rangers (Yeomanry) No. 11 Company Yorkshire Dragoons (Yeomanry) No. 12 Company South Notts (Yeomanry) 3rd Bn. Staff Hospital Staff Veterinary Staff 4th Bn. Staff 5th Bn. Staff 8th Bn. Staff Machine Gun Section	Left England for South Africa in the "Winifredian."
,,	,,	1st Bn. Berkshire Regiment Detachment 3rd Bn. Royal Fusiliers Southern and Eastern Divisions R.A.	Left England for Gibraltar in the "Cephalonia."
,,	,,	320 Reserve Horses One Transport Section Twelve 15-Pr. and Six 4·7 Naval Guns	Left India for South Africa in the "Upada."
,,	,,	Ammunition Column 6th Division Mounted Infantry 6th Division Detachment No. 18 Company R.A.M.C. (Field Hospital)	Arrived at Cape Town from England in the "British Prince."
,,	,,	Draft 19th Hussars Detachment 45th Company R.E. Remounts Details	Transferred from the "Denton Grange." Arrived at Cape Town from England in the "Siberian."

29th	(M.)	2nd Tasmanian and remainder of 2nd New South Wales Contingents left Sydney for South Africa in the "Moravian."	
,,	,,	6th Bn. Royal Warwickshire Regiment (Militia) 4th Bn. Derbyshire Regiment (Militia) 3rd Bn. Durham L.I. (Militia) Detachment No. 20 Company R.A.M.C. (Bearer Company)	Arrived at Cape Town from England in the "Umbria."
,,	,,	15th Brigade Staff City of London Imperial Volunteers (265)	Arrived at Cape Town from England in the "Briton."
30th	(T.)	No. 5 Company Warwickshire Yeomanry No. 21 Company Cheshire Yeomanry No. 22 Company Cheshire Yeomanry No. 32 Company Lancashire Hussars (Yeomanry) 2nd Brigade Staff Hospital Staff Veterinary Staff No. 7 Company Leicester Yeomanry No. 23 Company Lancashire Hussars (Yeomanry) No. 24 Company Westmoreland and Cumberland Yeomanry Machine Gun Section	Left England for South Africa in the "Lake Eric."
31st	(W.)	12th Brigade Division R.F.A. (Howitzer) Ammunition Column Draft 13th Hussars ,, 1st Bn. Border Regiment ,, 1st Bn. Loyal North Lancashire Regiment Remounts Detachment No. 6 General Hospital	Left England for South Africa in the "British Princess."
,,	,,	Mounted Infantry 6th Division Detachment No. 6 Company R.A.M.C. (Field Hospital)	Arrived at Cape Town from England in the "America."

FOREIGN PERIODICALS.

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Kiau-Chau" (*continued*). "Some Notes on Experiments with Water-tube Boilers fitted with Tubes of Small Diameter." "Proverbs and Proverbial Methods of Speed about Seamanship." "Sea and Fishing Life in the German Language" (*continued*). "Nordelbisch-Danisch" (*continued*). "Statistical Health Report of the English Navy for 1897." "Health Report of the United States Navy for 1897 and the Period of the War with Spain." "Health Report of the Imperial Japanese Navy." "Electrical Auxiliary Engines of H.M.S. 'Ægir.'" "Foreign Naval Notes."

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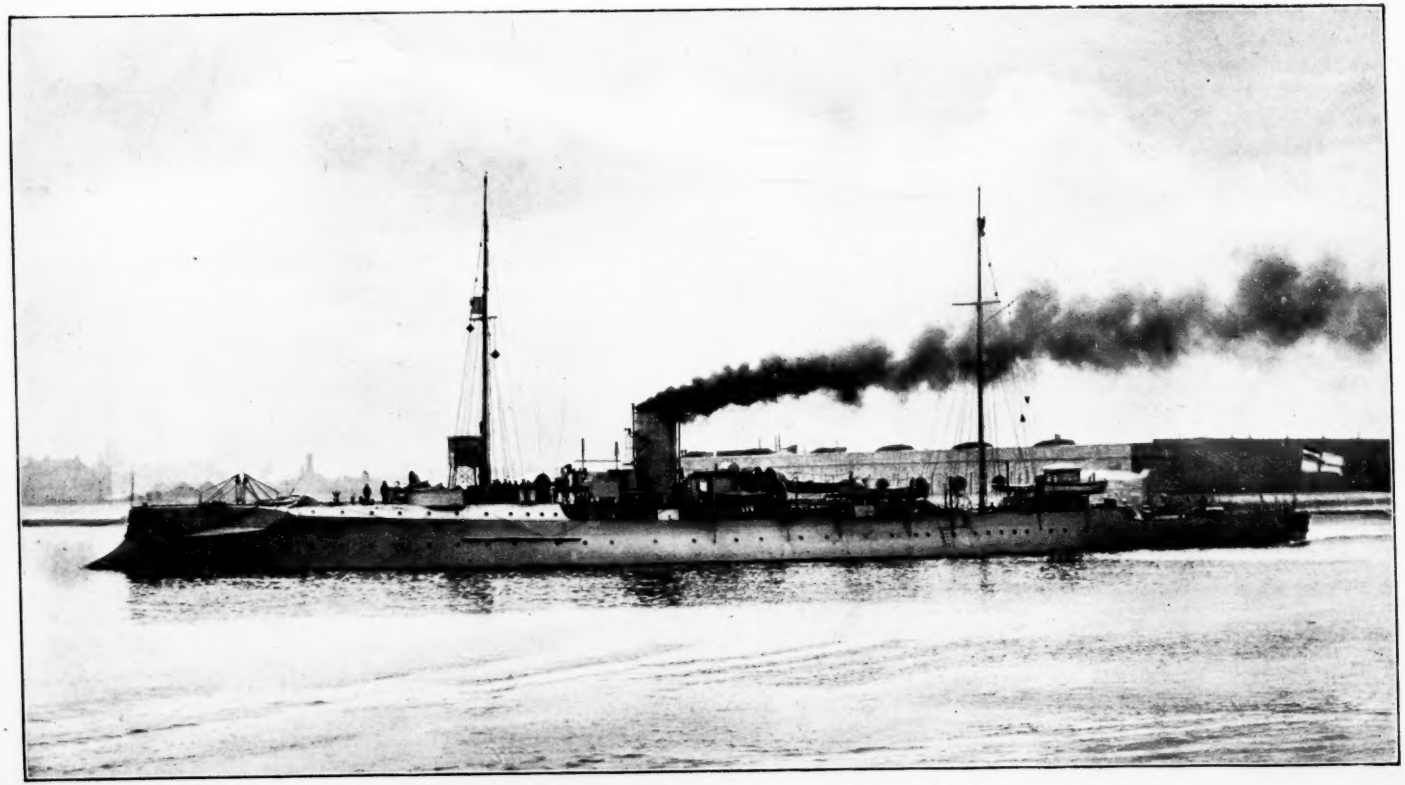
NOTICES OF BOOKS.

The 95th (The Derbyshire) Regiment in the Crimea. Crown 8vo. London: Swan Sonnenschein & Co.

Quite a new departure in regimental literature marks the publication of what is known as the *Derbyshire Campaign Series.* It is practically a history of the campaigns in which the present 2nd Battalion of the Derbyshire Regiment—what was known up to 1881 as the 95th—has figured, commencing with the Crimea. Vol. I., which deals with that campaign, is the first of the series, and has been very well written by Major H. C. Wylly, at present serving in the battalion, and Major-General J. F. Maurice contributes a preface. The 95th served with distinction in the Crimea under Webber-Smith, Champion, Henry Hume, and A. T. Heyland, and its good work at the Alma, Inkerman, and Sebastopol has been described with much interesting detail. There are some appendices, which enhance the value of the book, while the price at which it is published, 1s., places it within reach of all, and it will no doubt command a ready sale amongst past and present officers. Death is thinning the ranks of those who fought in the Crimea, but there are still living General Sir J. A. Raines, Major-General E. D. Smith, Major-General C. F. Parkinson, Major-General J. M. Sexton (who came from the ranks), Colonel H. G. Parke, Colonel N. Knatchbull, and Colonel G. L. Carmichael, Chief Constable of Worcestershire, all of whom fought with honour in the campaign.



The German First-Class Despatch-Vessel "HELA," 2,000 tons; 5,860 I.H.P.; Speed 20 knots.

J. J. K. & Co., London.